COTTON

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APRIL, 1914

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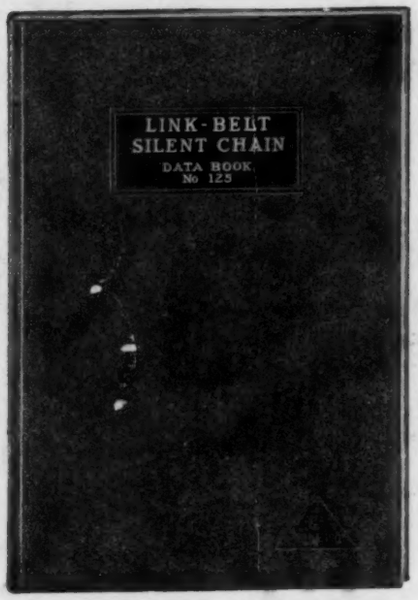

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FADDISTS AND THEIR FADS.

To paraphrase the poet, men may come and men may go, but the faddist is with us always. There are many different varieties of this species, but probably the most persistent is that particular variety who desire to tell us how to conduct our personal affairs, and particularly how to bring up and educate our offspring, or, to be more exact, how not to do it.

These so-called "child labor enthusiasts" continue right on the job in spite of the requests and entreaties on the part of the cotton mill operatives that they be allowed to conduct their own business in such a manner as seems most suitable. Complaints from the operatives have been heard in Massachusetts, North Carolina, Alabama and Mississippi, but the "enthusiasts" continue to "enthuse," being paid a reasonable salary therefor. Here we have the meat in the cocoanut. Its a mere matter of money. Men and women must have the necessities and some of the luxuries of life, and to secure these they follow along their special lines of endeavor, making the best bargain possible, and doing as little real productive work as they may, and still satisfy their material demands. Therefore the gambler gambles, the speculator speculates, the ditch digger digs ditches, and the enthusiast enthuses—all for money.

New Orleans was the scene of a National Child Labor Conference last month. At this meeting a number of "secretaries," "special agents," "state inspectors" and other officials presented their compliments to the legislatures of the Southern states and to the cotton manufacturers doing business therein. Heaven only knows where they find the connection! The principal point to bear in mind, however, is that of money. Who paid the expenses of these delegates? Would they so freely traverse the length and breadth of the country to "enthuse" on the shortcomings of other people if they earned the expense money for these trips by digging potatoes? If, think you, it became necessary for the women and children of their respective families to also dig potatoes in order to pay the rent, or buy shoes for the baby, or pay the butcher's bill, would they deem it necessary for a state law to be passed prohibiting the digging of potatoes by children and limiting women to a certain number of hours' work per day? Would they appreciate being told by representative boss farmers or a committee of bank presidents that they were a shame and a disgrace to the community because they were poor?

The cause of all child labor is poverty. The poor man loves his child just as much, and often more, than the rich man, yet common necessity compels cooperative effort. Can this man be made rich by prohibiting his child from working? On the contrary, he will become just that much poorer, and when this man becomes a class and his child hundreds or thousands in number, then the vice records of that state will grow larger.

It is true the wage of the man might be increased a proportionate amount and allow him to make better provision for his family by adding a small accretion to the production cost of the article manufactured or otherwise created. It is equally true that if the non-producers were removed and put to doing real work, productive work, the present cost of living would be less. This vampire class absorb the blood and sinew of the working man while pretending to be entirely concerned in his future welfare. If the various "special agents," "secretaries" and other non-producing units would join the "back to the farm" movement, and become real producers by literally growing and digging potatoes, the working man, whether mill operative or other, would arise and call them blessed.

A WAREHOUSE SYSTEM FOR COTTON.

"Everything comes to him who waits"—providing he works hard enough in the interim and directs his energy along suitable lines.

More than sixty years ago, in 1851, a cotton planters' convention at Tallahassee, Fla., urged the chartering by five Southern states of a corporation with a minimum capital of twenty million dollars to erect or purchase extensive cotton warehouses, located at suitable points, as a remedy for the difficulties of cotton growers.

In December, 1904, D. A. Thompkins, of Charlotte, N. C. delivered an address at Shreveport, La., before the National Cotton Convention, in which he stated that, because of the delicacy of the cotton plant and the extreme variations in the climatic conditions, the size of the annual crop could not be accurately forecasted, and that this created a condition which allowed the speculator to hold high carnival when dealing with cotton. The legitimate merchant and manufacturer were made to turn gambler, whether they would or not, and the ordinary course of trade was, therefore, tremendously disturbed.

As a remedy for these conditions, he recommended some kind of artificial regulation whereby the price over a period of, say, ten years would be brought to an approximate average. He thought this might best be done by the development of a system of warehouses, which were authorized to issue a certificate which would not only stand for a bale of cotton, but also give the general classification, the grade, the length of staple, the degree of tinge, the degree of softness and the degree of fineness in accordance with the judgment and skill of the best and most expert graders obtainable.

Such a warehouse certificate, backed by a responsible company guaranteeing this record, would stand for much more than a mere receipt with the banker, the merchant and the mill man. It would, in fact, become negotiable collateral of an approved type.

During the intervening ten years since Mr. Thompkins so ably presented this subject it has been frequently discussed and a number of tentative plans worked out. In the special warehouse issue of COTTON in March, 1912, the then present conditions were fully outlined and thoroughly illustrated, and editorially COTTON urged the South's need of better baling, warehousing and handling facilities for its great cotton crop. At that time we said: "The producers desire it, the merchants desire it, and the cotton manufacturers desire it. It is something that must come in time. The sooner that time arrives the sooner will the South be able to retain a larger percentage of the money derived from its valuable cotton crop, not only from the lossage occurring from poor handling, but also by the equalization of cotton prices because of the better warehouse facilities furnished and by the ability of the less prosperous producers to thereby hold their cotton until such time as a reasonable market price shall be afforded."

The past month has seen enthusiastic gatherings in the Carolinas and the appointment of a committee of organization, representative of the cotton interests of the country, to work out the details of a comprehensive system for the warehousing of the South's cotton crop. This looks promising as the preliminaries of a definite step forward in this plan which has been under consideration for so many years.

The plan outlined at these meetings is to organize a string of cooperative warehouses and amalgamate these into one impregnable concern whose certificates will receive world-wide recognition. This will include the receipt, weighing, sampling, grading and insured storage of bales of cotton, the issuance of the warehouse certificates referred to, and some system of sealing, inspecting and auditing. Also a recognition of these warehouse certificates by banking interests of such standing as to guarantee the integrity of the collateral, represented by the certificate. The whole system to be under the control of a board of directors and executive officers chosen from financial centers practically free from connection with the users of the warehouse.

In this connection it was also brought out at these meetings that Vice-President Samuel McRoberts, of the National City Bank of New York, has, after a thorough investigation, indicated the willingness of this bank to handle paper from an organization of the character outlined, and New York cotton circles are reported to be enthusiastic over the proposition, believing it will ultimately influence the whole cotton trade.

This present warehouse plan is being advanced by J. B. Duke, of New York, who has been giving it his thoughtful consideration for some time. It is receiving enthusiastic support from such well-known men as John A. Law, Stuart W. Cramer, J. W. Cannon, W. A. Erwin, J. P. Gossett, D. Y. Cooper, Lewis W. Parker, R. M. Miller, Jr., J. B. Hammett, E. A. Smythe, C. E. Hutchinson and W. S. Lee.

COMING CONVENTIONS.

The convention season is now at hand and beginning with the American Cotton Manufacturers' Association at New York on April 27th and 28th, they follow rapidly with the National Cotton Manufacturers' Association at Boston on April 29th and 30th; the Fourth National Textile Exhibition at Boston from April 27th to May 2nd; The Georgia Cotton Manufacturers' Association at Atlanta on May 9th and 10th; the National Association of Hosiery and Underwear Manufacturers at Philadelphia from May 11th to 14th; and the Southern Textile Association at the Isle of Palms, Charleston, S. C., on June 12th and 13th.

The South has the most attractive winter, summer and all-the-year-round resort cities and sections, on coast and in the mountains, where the climatic, scenic and other advantages and attractions are combined.

MODERN MACHINERY AND EFFICIENCY

A Refutation of the Claim That Scientific Management Spells Ruin to Either the Wage-Earner or the Community. Knowledge and Tools Working for Modern Civilization

BY "A MANUFACTURER."

I was much interested in the article on "Industrial Scientific Management," which was printed in the January issue of Cotton. While Mr. Fels advances some rather unique ideas in criticizing the Taylor system of "Scientific Management," he also introduces some very fallacious argument. He says, for example, that under "Scientific Management" one-half the cotton operatives will be thrown out of employment. It is true this statement is not his main point, which seems to be a different method of taxation, but the statement as a statement stands, and although improved machinery and methods have been introduced in all industrial lines for many years, the country is still far from being overcrowded with waiters, servants, chauffeurs, butlers and footmen. Perhaps the percentage of doctors and lawyers has increased a bit, but otherwise the division of labor seems fairly normal.

Probably I could advance no stronger argument in refutation of this statement made by Mr. Fels, and it is a statement which bears the mark of approval of most labor unions, than by offering herewith the following extracts from an address by Clarence Poe before the Fourteenth Educational Conference:

"The prosperity of every man depends upon the prosperity (and therefore upon the efficiency) of the average man. The welfare of every individual depends upon the uplift of the great masses of the people. The most impressive fact I discovered in all my trip through the Orient was the fundamental, world-wide importance of this too little accepted economic doctrine. It is the biggest lesson that the Old World has for the New—the biggest and the most important.

"Certainly any man who keeps his eyes open on a trip through the Orient cannot fail to have it burned into his consciousness how completely the laws of changeless justice decree that you must rise or fall, decline or prosper, with your neighbor. Nowhere in either America or Asia can the individual accomplish much unless the great masses of the people have been trained to efficiency. It is true alike in the oldest continent and in the newest that you prosper just in proportion to the prosperity of the average man with whom you are brought into business contact. Every man who through ignorance, lack of training, or by reason of any other hindering cause, is producing or earning only half as much as he ought, by his inefficiency is making everybody else in the community poorer.

"In short, your prosperity, no matter in what wholesome line of business you are engaged, depends upon the prosperity of the average man; the prosperity of the average man depends upon his efficiency; his efficiency depends upon his intelligence of a practical sort.

"In America education, democratic institutions, and a proper organization of industry have given the average man a high degree of efficiency and therefore a high degree of prosperity as compared with the lot of the average man in the Orient—a prosperity heightened and enhanced in our case, it is true, by the exploitation of a new continent's virgin resources, but after all due mainly, primarily, to the high degree of efficiency with which the average man does his work.

"Thus while there may be 'too much Ego in our Cosmos,' as Kipling's German said about the monkey, for us to like to admit it, the obvious truth is that here in America you and I personally and individually deserve very little credit for the prosperity and comforts that we enjoy. It is not what we have earned, it is what we have inherited, that enables us to live free from want and hunger—and this is true even of those of us whose fathers did not leave property enough to pay their funeral expenses. In any case we have inherited our share in a civilization and in an industrial organization so developed that it offers the average man more than enough to hold soul and body together—as oriental civilization does not.

"Herein lies the real mainspring of the difference between the prosperity you enjoy in America and the want that you would suffer if you had been born in the Orient. We live in better homes, have more leisure and more recreation, endure less bitter toil; in short, we find human life fairer and sweeter than our fellowman in Asia not because you or I, as individauls, deserve so much better than he, but because of our richer racial heritage. We have been born into a society where a higher level of prosperity obtains, where a man's labor and effort count for more, simply because of what previous generations have done for increasing the efficiency of the masses through tools and knowledge, education and machinery.

"Let us see how this principle works out in the Orient.

"In China a member of the Emperor's Grand Council told me that the average rate of wages throughout the Empire is probably 18 cents a day. In Japan it is probably not more, and in India much less. The best mill workers I saw in Osaka average 22 cents a day; the laborers at work on the new telephone lines in Peking get 10 cents; wheelbarrow coolies in Shanghai $4 a month; linotype operators in Tokio 45 cents a day and pressmen 50, policemen 40; the iron workers in Hankow average 10 cents; street car conductors in Seoul make 35 cents; farm laborers about Nankou 10 cents. The highest wages are paid in the Philippines where the ordinary laborer gets from 20 to 50 cents.

"In India, an Englishman who had lived in an interior jungle village, five days by bullock cart from a railway, told me that twenty years ago laborers were paid two rupees (64 cents) a month, boarding themselves, or 4 rupees ($1.28) a year and grain. The wages have now advanced, however, to 5 rupees ($1.60) a month where the man boards himself; and for day labor the wages are now five annas (10 cents) instead of two annas (4 cents) twenty years ago. In Madura a well educated Hindu with whom I was talking rang the familiar changes on the 'increasing cost of living'

and pointed out the fact that in the past four or five years the cost of unskilled labor had increased from eight to twelve cents a day. 'And in some towns,' he declared, looking at the same time as if he feared I should not believe his story, 'they are asking as much as 8 annas (16 cents) a day.' In Bombay I was told that coolies average 16 to 20 cents a day; spinners in jute factories $1.16 a week, weavers, $1.62. In a great cotton factory I visited in Madras, employing about 4,000 natives (all males) the average wages for eleven and eleven and a half hours work is $3.84 to $4.85 a month. In Ahmedabad, another cotton manufacturing center, I found about the same scale in force. Miners get 16 to 28 cents a day. Servants average from $3.20 to $3.84 a month.

"For farm work Director of Agriculture Couchman, of the Madras Presidency, gave me the following as the usual scale of wages: Men, 6 to 8 cents a day; women, 4 to 6 cents; children, 3 to 5 cents, the laborers boarding themselves.

"Moreover, there is a savage struggle for employment even at these low figures; men work longer hours than in America, and their tasks are often heart-sickening in their heaviness! Tasks such as an American laborer would regard as inhuman.

"Take, for example, the poor fellow who pulls the jinriksha. He is doing work that horses and mules do at home, and for wages such as our Southern negroes would refuse for ordinary labor. More than this, in most cases he is selling you not only his time but his life-blood. Run he must with his human burden, and faster than Americans would care to run without a burden; and the constant strain overtaxes his heart and shortens his days. More than this, he must go in all kinds of weather, and having become thoroughly heated, must shiver in the winter wind or driving rain during waits. The exposure and overtaxing of the heart are alike ruinous. The riksha man's life, I was told in Japan, is several years shorter than that of the average man.

"And yet so many men are driven by the general poverty into the riksha business that I hardly found a city in all the East in which it is not overcrowded. In Peking on one occasion I almost thought my life endangered by the mob of riksha men who jostled, tugged, and fought for the privilege of earning the 10 to 20 cents fare my patronage involved; in Hong Kong two runners, wild-eyed with the keenness of the savage struggle for existence, menaced the smaller, younger man I had hired as if they would take me by force from his vehicle to their own—and this for a climb so steep that I soon got out and walked rather than feel myself guilty of 'man's inhumanity to man' by making a fellow-being pull me up the sheer incline. Fiercer yet was the competition in Hankow where not even the brutal clubbing of the policeman was enough to keep the men in order. In wintry Newchwang I think it hurt me almost as much as it did my riksha man to see him wading through mud and foulness such as I should not wish my horse to go through at home—though if he had not waded I should have had to, and he was the more used to it!

"I mention the hard life of the oriental laborer who pulls the jinriksha, because it is typical. The business would not be crowded if it were not that the men find life in other lines no better.

"Consider the thousands of Chinese and Japanese who do the work not of carriage horses but of draft horses. From the time you land in Yokahama your heart is made sick by the sight of half-naked human beings harnessed like oxen to heavily-laden carts and drays. Bent, tense, and perspiring like slaves at the oar, they draw their heavy burdens through the streets. One or two men wearily pull an immense telegraph pole balanced on a two-wheeled truck. Eight or ten men are harnessed together dragging some merchant's heavy freight. Four to a dozen other men carry some heavy building-stone or piece of machinery by running bamboo supports from the shoulders of the men behind to the shoulders of the men in front; you can see the constant, tortuous play of the muscles around each man's rigid backbone, while the strained, monotonous, half-weird chorus, "Hy-ah; Hul-lah! Hee-ah! Hey!" measures their tread and shifts the strain from man to man, step by step, with the precision of clock-work. On the rivers in China, too, one sees boats run by human tread-mill power; a harder task than that of Sisyphus is that of the men who sweat all day long at the wheel, forever climbing and never advancing.

"Nor do the women and children of the Orient escape burdens such as only men's strong shoulders should bear. Children who should have the freedom that even the young colt gets—how my heart has gone out to them, cheated out of the joys of childhood! And the women with children strapped on their backs while they steer boats and handle passengers and traffic about Hong Kong!

"Or leave, if you will, the water-front at Hong Kong and make the hard climb up the steep, bluff-like, 1,800-foot mountainside, dotted with the handsome residences of wealthy Englishmen: you can hardly believe that every massive timber, every ton of brick, every great foundation stone, was carried up, up from the town below by the tug and strain of human muscle—not merely human muscle, but in most cases the muscle of women! Probably no Governor in any State in America lives in a residence so splendid as that of the British Governor-General of Hong Kong—certainly no Governor's residence is so beautifully situated, half-way up a sheer mountain-slope—and yet the wife of the Governor-General told me that the material used in the building was brought up the mountainside by women!

"The women in Calcutta (some of them with their babies staked out like calves while they worked) whom I saw carrying brick and mortar on their heads to the tops of three and four-story brick buildings, get 3 to 4 annas a day—6 to 8 cents.

"In Darjeeling the bent and toil-cursed women I found laden like donkeys as they brought stone on their backs from quarries two or three miles away, managed to make 12 to 16 cents a day for their bitter toil up steep hills and down, but women who carried lighter loads of mud, making 50 trips averaging 20 miles of travel a day, earned only 8 cents. The same wages were paid the women with babies strapped on their backs, who nevertheless toiled as steadily as the others.

"Hardly better fare the women in the oriental factories. I know mills in Shanghai where women work thirteen and a quarter hours for 12 cents a day; and in most cases the women in eastern factories are herded together in crowded compounds little better than the workhouses for American criminals!

"So much by way of a faint picture of existing industrial conditions in the Orient. Now for the lesson.

"Ordinarily, of course, when one asks the question, 'Why is it that the oriental gets such low wages, and has such a low earning power?' the answer is 'An over-crowded

population. In China, for example, four hundred million people, one-fourth the human race, crowded within the limits of one empire. This is the cause.'

"I don't believe it.

"There is a limit, no doubt, beyond which increase of population even with the most highly developed system of industry, might lead to such a result but I do not believe that this limit has been reached even in China. The people in England live a great deal better today than they did when England had only one-tenth its present population. The average man in your country has more conveniences, comforts, and a better income than he had in your grandfather's day when the population was not nearly so dense. The United States with a population of ninety million pays its laborers vastly better than it did when its population was only thirty million.

"The truth is that every man should be able to earn a little more than he consumes; there should be a margin, an excess, that should constitute his contribution to the 'common wealth,' to the race. Our buildings, roads, railroads, churches, cathedrals, and works of art—everything that makes the modern world a better place than the primitive world—represent the combined contributions of all previous men and races. And if society be so able to handle men that they produce any fraction more than they consume, the more men the better the world.

"My own conviction is that the oriental nations are poor, not because of their dense population, but because of their defective industrial organizations, because they do not provide men, *tools and knowledge* to work with.

"*Ignorance and lack of machinery*—these have kept Asia poor, *knowledge and modern tools*—these have made America rich.

"If Asia had a Panama Canal to dig, she would dig it with picks, hoes, and spades, and tote out the earth in buckets. Nothing but human bone and sinew would be employed, and the men would be paid little, because without tools and knowledge they must always earn little. But America puts brains, science, steam, electricity, machinery into the Big Ditch—tools and knowledge, in other words—and she pays good wages because a man thus equipped does the work of ten men whose only force is the force of muscle.

"But Asia—deluded, foolish Asia—has scorned machinery. 'The more work machinery does, the less there will be for human beings to do. Men will be without work, and men without work will starve.' With this folly on her lips she has rejected the agencies that would have rescued her from her never-ending struggle with starvation. Oftentimes, we know, the same cry has been heard in England—and alas! even in America; our labor unions even now sometimes lend a willing ear to such nonsense. There were riots in England when manufacturers sought to introduce labor-saving methods in cotton-spinning; and when railroads were introduced among us, there were doubtless thousands of draymen, stage-drivers and boatmen who, if they had dared, would have torn up the rails and thrown them into the rivers, as the Chinese did along the Yangste-Kiang. With much the same feeling the old-time hand-compositors looked upon the coming of the type-setting machine.

"And yet with all our engines doing the work of millions of draymen and cabmen, with all our factory-machines doing the work of hundreds of thousands of weavers and spinners; with all our telegraph and telephones taking the places of numberless messengers, runners, and errand boys; and with a population, too, vastly in excess of the population when old-fashioned methods prevailed, the fact stands out that labor has never been in greater demand and has never commanded higher wages than today.

"The explanation is very simple. If a labor-saving machine enables fifty men to do the work it formerly required a hundred men to do, in producing some necessity of life, then the released fifty men, the fifty whose services were dispensed with, are free to produce some comfort or luxury for which the increased earnings of the retained fifty will help provide a market. This has been the history of all industry, as we know. A study of the very elements of industrial evolution teaches us that at first with crude tools and knowledge it probably took the primitive man all his time to provide food for himself—game, fish, grain, fruits. Then there came a time when with better tools and better knowledge, only half the men were required to produce the food—whereupon the other half did not starve, but began making clothing and building houses for the whole number, and everybody lived better than before. Still later there came a time when with increasing knowledge and increasing mechanical power, all the men were not required to produce food, clothing, and shelter, and some were released for gathering knowledge, writing books, making music, painting pictures, carving statues, for searching after spiritual truth, and for teaching that life is more than meat or raiment—and all men lived infinitely better, found it easier to get employment, and earned higher wages than ever before, in spite of their great increase in numbers.

"All this doctrine Asia has rejected, or has never even got to the point of considering. In America a motorman or conductor by means of tools and knowledge—a street-car for a tool and the science of electricity for knowledge—transports forty people from one place to another. This motorman and this conductor are high-priced laborers from the oriental standpoint, and yet it costs you only five cents for your ride, and five minutes' time. In Peking, on the other hand, it takes forty men pulling rikshas to transport forty passengers; and though the pullers are 'cheap laborers,' it costs you probably ten to twenty cents and one to two hour's time to get to your destination—even if you are so lucky as not to be taken to the wrong place!

"In the long run, it all boils down to this: That your prosperity is dependent upon the prosperity of the people with whom you have to deal; that their prosperity depends upon their efficiency, and that efficiency is mainly a matter of tools and knowledge, education and machinery. In no case, must we forget that education, if it is to be effective, must train for efficiency, must link itself with life and work, must be practical. Knowledge and tools must go hand in hand."

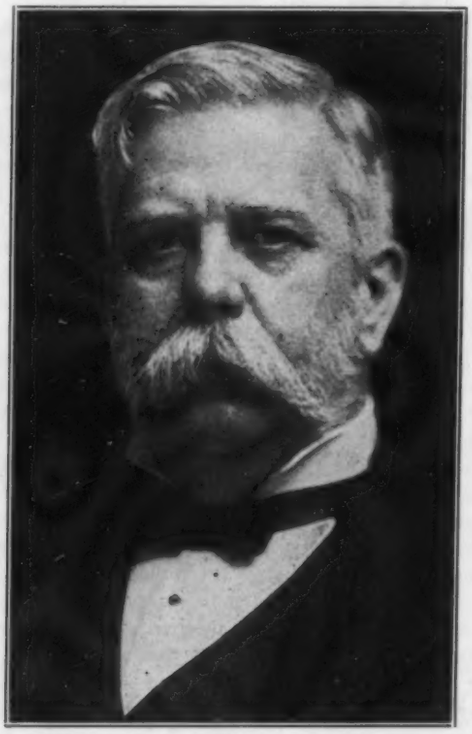
A better industrial relations exhibit will be held April 18 to 25 at 2 West Sixty-fourth street, New York City. It will show the devices in modern business which tend to make more harmonious the relations between employer and employee, and to better the conditions of employment. The business men's group of the Society for Ethical Culture has charge of the exhibit, which will appeal to both employer and employee in the manufacturing trades. There will be special evening lectures by industrial leaders of the country. No admission will be charged.

GEORGE WESTINGHOUSE.

George Westinghouse, the famous inventor and engineer, died of heart disease at his New York City residence on Thursday, March 12. His health had been failing for some time and consequently his death, though a great shock to his thousands of friends and acquaintances all over the country, was nevertheless in a measure anticipated.

Although actively associated with a large number of industries, he had during the last few years begun to transfer his responsibilities to the shoulders of his trusted lieutenants, the fortunate selection of which has always been one of the leading characteristics of his varied career. His demise therefore will not cause any material change in the policy or operation of the companies so indelibly linked with the name Westinghouse.

George Westinghouse was born at Central Bridge, Schoharie County, N. Y., on the 6th of October, 1846; his parents were George and Emeline Vedder Westinghouse. The



The Late George Westinghouse.

father's ancestors came from Germany and settled in Massachusetts and Vermont before the Revolution; the mother's were Dutch-English.

Going to Troy one day, a delay caused by a collision between two freight trains, suggested to Mr. Westinghouse the idea that a brake under the control of an engineer might have pevented the accident. The inventor began to think over the matter, and, after much study and investigation, the use of compressed air impressed itself on him. Drawings of the air-pump, brake cylinder and valves were made, but considerable time elapsed before a practical trial of the brake was obtained. The first patent was issued April 13, 1869, and the Westinghouse Air Brake Company was formed on the 20th of July following.

Many changes and improvements were being made in the brake, and in 1870 Mr. Westinghouse went abroad to introduce the air brake in England. Not only did this require the spending of seven years in Europe, between the years 1871 and 1882, but it taxed his inventive ability considerably to meet the new conditions of railroad practice.

In the meantime, Mr. Westinghouse invented the "automatic" feature of the brake which overcame the imperfections in the first form, and removed the danger from the parting of trains on steep grades. In 1886, he invented the "quick-action" brake, the improvement being made in what is known as the "triple-valve." By this valve it became practicable to apply all brakes on the train of fifty freight cars in two seconds.

About 1880, Mr. Westinghouse became interested in the operation of railway signals and switches by compressed air, and soon after there was developed and patented the system now manufactured by The Union Switch & Signal Company. In 1886 the Westinghouse Electric Company was formed for the manufacture of lamps and eletric lighting apparatus, Mr. Westinghouse having become interested in the subject. The business rapidly developed and in 1889 and 1890 this company absorbed the United States Electric Company and the Consolidated Electric Light Company. In 1891 all these properties were reorganized into the Westinghouse Electric & Manufacturing Company, which owns extensive works at East Pittsburg, employing over 22,000 people.

He became interested in the development of the Parsons steam turbine and later rendered an invaluable service to the electric development of the world, when, in spite of opposition, ridicule and all the unfair efforts to crush his alternating current system, he remained steadfast in his belief that this class of high-tension transmission would make distant electrical distribution possible.

Owing to his many achievements in mechanics, electricity, steam and gas, his name was known the world over, and he had many honorable distinctions conferred upon him for his achievements and in recognition of the services he rendered the various branches of engineering. His alma mater, Union College, of Schenectady, conferred upon him the degree of doctor of philosophy. He was decorated with the order of the Legion of Honor, with the order of the Royal Crown of Italy, with the order of Leopold of Belgium. He was the second recipient of the John Fritz medal. He received the degree of doctor of engineering from the Koenigliche Technische Hochschule of Berlin, Germany. He was an honorary member of the American Society of Mechanical Engineers, of which body he was also president in 1910. He was one of the two honorary members of the American Society for the Advancement of Science. He was an honorary member of the National Electric Light Association of America. He was awarded the Scott premium and medal by the Franklin Institute of the State of Pennsylvania. He received the Edison gold medal for meritorious achievements in the alternating current system of electrical distribution. He received the Grashof gold medal from the Society of German Engineers in Germany, which acknowledged him the greatest American engineer.

Mr. Westinghouse was connected with a number of industries and the Westinghouse companies employ 50,000 men on whom 150,000 persons are dependent. The total capitalization of all the companies is $200,000,000.

Mr. Westinghouse was married August 8th, 1867 at Brooklyn, N. Y., to Marguerite Franklin Walker. They had one son, George. His wife and son survive him.

THE MASSACHUSETTS CHILD LABOR LAW.

The Massachusetts child labor law, recently passed, is creating nation-wide interest because the well-meaning, philanthropical enthusiasts are trying to have similar laws enacted in other states. Because of this fact, we are reproducing herewith some extracts from the dissenting report submitted by Channing Smith, a member of the Massachusetts State Board of Labor and Industry, to the legislature of that state.

That instances similar to those cited are still occurring is evidenced by the following news note from the New Bedford (Mass.) *Times* of March 5th:

"The mysterious disappearance of Miss Frances Wanat, the 16-year-old daughter of Mr. and Mrs. Valentine Wanat, of 176 North Front street, and the subsequent cutting off of the family's income to the extent of $5.50, her earnings in the mill, has thrown the family into destitute circumstances and forced the mother to apply to the poor department for her daily bread.

"Frances left the city as a result of a rebuke from her mother last Tuesday. The Wanat family comprises six children, only one of whom is able to work. She earns $2 a week, the only income realized by the Wanats. The father recently met with an accident when he slipped on the ice and injured a knee. He has been confined to his bed since then. The poor department this morning promised to send one of its staff of physicians to the sick man. This will be the first medical aid he will have received since the accident.

"The services of the police of station 5 were enlisted in the search for the missing girl. During her father's illness her wage has been the sole means of supporting the entire family, and, with this cut off, her absence is felt very keenly.

"Catherine, who is 14 years old, made as much as $6 or $7 a week until the child labor law took effect, but she now adds but $2 to the family coffers weekly."

Mr. Smith, in his report, said:

"Disagreeing with the majority report of the Board of Labor and Industries, I beg to submit the following minority report:

"I disagree because I cannot lend my aid to the coloring of any conditions affecting labor and industry, and must state facts as I see and hear them.

"Representing industry on the board, I hesitate, personally, in taking this action, for fear that my position may be misunderstood, as I desire protection of children as much as anyone. But as an officer of the commonwealth, and knowing what present statistical returns show, I feel it my duty to state my judgment on and experience with the enforcement of the present child labor laws—laws which should be amended in fairness to both labor and industry.

"The underlying principle of the present law is all right, but it has been carried too far, and my sympathy is with the workers whom it has hit as much as the manufacturer. While I am a member of the Board of Labor and Industries, I shall join with my colleagues and insist that all the laws under our jurisdiction shall be enforced to the letter; but in so doing I shall feel that we are bringing to many citizens of this commonwealth much hardship and unnecessarily interfering with their private lives.

"I feel that in passing my whole life as boy, man and manufacturer in close communion with the workers of a mill town, as many other so-called slave-drivers have done, this life has brought us in touch with the conditions and needs of the workers whom the present law is supposed to benefit, more so than the framers of the law or their paid agents. My sympathy goes to the rank and file of labor, for whom no one seems to lend a helping hand against the misguided efforts of paid agitators, social workers and professional politicians.

"When we see and hear, coming from all over this commonwealth, the cry of fathers and mothers of families, of the hardships which the enforcement of the present child labor law brings in the way of reduced family income, and in the face of the high cost of living today—I say it is high time that we stop and look the situation in the face, and in this stopping ask ourselves whether we have the right to interfere with the rights of people to live. It has been argued that these complaints come from those parents who exploit their children for their material gain. No baser slur could be cast at the fathers and mothers of Massachusetts.

"The workingman with a large family to support and feed should have the benefits of the earnings of the older children, and at the same time the right should not be taken from the ambitious boy or girl to start in to learn efficiently a trade.

"When we hear the complaints of the mothers of girls employed in the stores of Boston and other cities working in shifts according to provision made by the law, and at the intermission that goes with their change of shifts being told that they must loaf for a few hours, and leave the place of employment, not the fault of the merchants, but the law, and walk the streets rather than go home for a few hours, more or less, between shifts, paying car fare and eating into their wage—the complaining mothers saying they would rather have their girls work sixty hours per week than be subjected to these temptations—my voice must be heard in their behalf and true conditions told.

"When I know 17,000 children between 14 and 16 years have been discharged from different industries of the state since September 1, and only a small percentage of those have returned to school, the balance walking the streets, fast learning all the vices which go with this idleness, we must ask ourselves wherein are the children under 16 years to gain more knowledge of English and truancy be decreased, according to the claim of the friends of this law?

"To be sure, the law says that habitual truants or absentees shall be committed to truant schools, but I am afraid there will not be truant schools enough to go around if attendance officers do their duty, and many young lives be wrecked or started on an uncharted course of crime.

"The picture of a little mill girl, procured with much difficulty, appearing on the front page of a leaflet sent broadcast throughout the state by the Massachusetts Child Labor Committee, in their desperate efforts to hold the wrong which they have put over on the citizens of this commonwealth, looks like a beautiful work of art when compared with the picture, which should go on the other side, of the children of the streets.

"The one drive has been made at the textile manufacturers of the state, but I know that these idealists, theorists and muckrakers have shot far above their mark, and mill conditions are not what they would have the public to be-

lieve. The vast amount of energy, sentimental in many cases, expended in suppressing the so-called child labor, can be more profitably employed by teaching children how to work.

"True manhood comes surer to the youth brought up in honest toil than one brought up in idleness, whether he be the son of rich or poor. Years ago the children were brought up to do their daily hard stint of work before any play or school began—the boys, the barn and farm chores or shop work, and the girls their shares of the house work, whether it were dish-washing, quilt-making or running the spinning wheel—and those were the days when men and women were produced—men and women who did the largest share in bringing the United States to where it is today.

"Massachusetts is in duty bound to give each of its children a good common school education, and by this I mean more of the old-fashioned grounding in reading, writing and arithmetic, and more benefits will be gained for the child by doing this than raising the school age to 16 years and putting in all the frills and fancies which go with the modern school education. At the same time the duty of the state is as great for the moral welfare of the child. Spare the rod and spoil the child finds its equivalent in spare the work and ruin the man.

"Our sympathy goes to a 21-year-old girl in a Northern Massachusetts town who, anxious to help along her exchequer by working one and one-half hours per day waiting on the table in a restaurant for her board, in addition to her present employment of fifty-four hours, is forbidden to do this because the present law says it is illegal.

"A young orphan in Worcester, who came to this country from a foreign shore, under 16, is forbidden to work more than forty-eight hours per week to keep body and soul together, and then forbidden to work at all because he cannot get an employment certificate, and is thrown on charity. We feel that he must begin to realize that the land of the free is somewhat of a myth.

"To a young lady in a western town, who is an assistant in a telegraph office, working seven hours and fifteen minutes per day, who desires to work a little extra, nights, to perfect her education in telegraphy, we must express our sympathy that her ambitions cannot be worked out without breaking the laws of the commonwealth.

"To the mother in Worcester County, deserted by her husband—of whom, in Massachusetts, there are many more in like circumstances—who, with eight children on her hands to support, the older ones being driven from the mills, and she obliged to leave her home and her children day by day to earn the money to keep the little band together—we say that her lot is a hard one, and that the law in this case does not bring about much but hardship, and deprives her of the pleasure of living and the children of the benefits of a mother's home care.

"Hundreds of such cases as those above quoted can be found in the state today, and I say it is high time that something be done toward repealing certain sections of the law.

"The direct industrial end of the proposition can best be summed up in the words of one of our biggest, best and most humane manufacturers, who, in answering this question, 'If you are not satisfied with the law, state briefly in what way it should be changed, both for yourself and to prevent hardship to working people,' wrote as follows:

"We think the best change would be to repeal the whole law. Massachusetts manufacturers are already overlegislated against, and when it comes to the situation where a member of the State Board of Labor and Industries is gathering statistics as to the number of families that such laws are driving to other states, it seems to us time to give the whole subject careful consideration. The minors under 16 years of age are only spending their time loafing on the streets during the short time, which is especially bad for girls so affected.

"In reports received from manufacturers in different lines of industry, I find that all agree as to the embarrassment caused in the working of their different industries by uneven lengths of working days for the different classes of help.

"The nicely balanced plants of modern industry—balanced from department to department, and from worker to worker—are soon thrown out of adjustment, the production lost, and the cost of production increased accordingly.

"Even if only a small proportion work eight hours a day against the remaining number working ten hours, it necessarily helps to disorganize the whole system, both plant and workers, and much dissatisfaction is expressed by the latter.

"The discipline in factories is much interfered with, and more discipline is what the youth of today needs. In practically all cases where children under 16 years have been retained in the industries, their pay is less, for the reason that under the new law they cannot work but eight hours a day, and as Saturday is a short day, the time on this day is but five and one-fourth hours on the average, making the total for the week 45¼ hours, instead of 48 hours, as the law intended; and it is out of reason to ask manufacturers to pay the same wages for 45¼ hours as they do for 54 hours. Many families have left the state because of this one fact.

"Up to January 1, 1914, there were issued in Massachusetts 158,513 working certificates. Of these 111,137 were literate certificates, or 70 per cent, issued to workers between 16 and 21 years.

"Nineteen thousand, three hundred and sixty-three were illiterate certificates, or 12 per cent. This number of certificates given to workers between 16 and 21 years.

"Twenty-eight thousand, three hundred and seventy-nine, or 18 per cent, were issued to children between 14 and 16 years.

"I feel that the 12 per cent of illiterate certificates issued is not so bad a condition when the greatest part of this percentage comes from five spots in the state, the children of which spots have not had the benefits of our schools, many coming from foreign shores in the last few years.

"On a return from 2,445 minors between 14 and 16 years employed when the child labor law took effect, 43 per cent were still retained, showing that manufacturers are doing their best to run with these minor hands on the uneven day basis, but 91 per cent of manufacturers, knowing the hardships for all concerned, are opposed to the present law.

"The general opinion is that the efficiency of the worker who starts in at 14 years is much greater at 20 years than the one starting at 16; and for those working on piece work this, of course, means a greater wage.

"Much is said and written about dead end positions of

industry, and I, for one, cannot see how these are to be avoided. In the last analysis this is a practical world, hard as it is to realize at times.

"Regrettable and sad as the facts are, all cannot be owners, agents, superintendents or foremen in industry, no matter what courses of education are brought forward. If the great industries of Massachusetts are to continue their existence here, they must be operated by employees the best fitted and the most efficient, even though they are dead end workers, and this efficiency can only be gained under actual working conditions.

"Strictly speaking, these dead end occupations are a fallacy, for in every industry there is always an opportunity for the men of brains, character and ability to go to the top. And the facts are that many owners, agents, superintendents and foremen have won their present stations in life's industry by the putting in of many hours of overtime, and beginning when young boys, and in what are now considered dead end occupations.

"I have yet to learn of one man who regrets this early work and training. Many men who have been so-called dead end workers have advanced in the next generation by their plugging, thrift and ability to save and enter business for themselves.

"The truth of the matter is that the managers of industry nowadays are finding it harder and harder to pick men from the rank and file who have the ambition to become overseers or bosses.

"The laws relating to industry today are all prepared and founded upon the ability of the strongest institutions to bear the burden.

"Those of highest capitalization and with great surpluses may be able to live under the many new requirements of laws enacted, but many citizens agree that the small manufacturer—and there are thousands of them in Massachusetts who are striving to get ahead under many difficulties—ought to be encouraged instead of hampered.

"The legislation of today tends to discourage and drive out of business the small concerns—the concerns who make your competition and the ones who should be allowed to live.

"If Massachusetts is to continue to be a leader industrially, we must call a halt on the theorist and faddist—people who have eagerly worked overtime in building up an industry of their own—an industry of busybodies who countenance attacks upon and seems delighted at the handicapping of the legitimate industries of the state and nation.

"Capital and labor, the great forces which have produced the wealth from which colleges and institutions of learning have received their magnificent endowments, must soon ask the theorist and faddist, the products of these institutions of learning, to return to their work of educating the youth of the land, allowing capital and labor to work out their own salvation, for which job I feel they are better fitted.

"At the proper time I may have some suggestions to make to your joint committees in relation to child labor."

Most of the spinning companies in the Kwanto district (Northeastern Japan) are not doing much business, and the tendency seems to be for the cotton industry to concentrate more and more in the Kwansai district (Osaka).

THE VITAL INTEREST IN BUSINESS.

BY HENRY D. MARTIN.

The success of any business depends upon vital interest. Vital interest means constant and serious attention to details. It must not be a flighty interest. Some one has said that the flight of time is caused by the spur of the moment. In business the spur of the moment must be the vital interest. The human element is the link between one detail and another detail, but it is the proper linking process that makes the business thrive. The links chain the details, but it is the vital interest which fastens all the different chains to the big end of the business and locks them to success. The framework of the business must be built up of vital interest.

Being vitally interested goes a long way; it does not stop at common interest—vital interest goes further. It strikes at the roots and digs deep down into the business. It also means hard work physically, as well as being mentally employed. It meant preserving the continuity of attention to the business without a break, and beginning where the other fellow leaves off; supplementing the strength of the operating force wherever it would fail to measure up or break under the strain. It means strong devotion to service, ambition to build for the future, also putting the shoulder under the burden before it might fall, and patching before a possible break.

Therefore, vital interest is not only a common burden carrier; it is also a preventer of disaster. The success of any business shows that somebody is immensely interested. Vital interest also interests others; makes good help out of poor material; creates individuality; makes others think for themselves; it inspires confidence; unites forces, concentrates attention and effort. Vital interest does not mean that the manager should do the work of ten men. It means that he will learn how to properly lay out the work for other men and set them to work with vitality. But if there are cracks in the vital interest of the leader, it will make holes in the foundation of the other workers and mar the efforts of success.

Being vitally interested does not rest on the mere duty at the point of contact itself—it goes beyond that, and studies the relation of other things above and beneath to the point of contact. For example; a person may have been taught by the vital interest of the manager to do certain duties well. The manager knows that while the work is being well done by that person today, tomorrow his good worker may be missing. Vital interest goes further and studies the bearing on this issue. Says he to himself, "What would I do if that person should be out sick a week, or leave his employment altogether." The employer asks himself, "What can I do that will be of some help to this valuable man, which may keep him vitally interested? I must encourage him to keep well, strong, and keep him satisfied. I must keep the business growing, so that I can keep him employed full time. Yes, and even promote him if he merits it, or replace him if he is not working with me." All this means a great deal which is sadly overlooked by some so-called "good managers," who often get caught napping. A good manager looks before as well as after, under as well as over, and walks all around the matter before leaving it, and often times the

matter will not even bear leaving; it is necessary to travel with it.

One of the most successful cotton managers in the country well amplified the above statement. He had trouble getting yarns to his mills. He had urgent orders to fill, and being fearful that another lot of yarn would not arrive in time, he went to the yarn shipper himself, helped to load the yarn aboard the car and rode in the freight car with it and followed it to its destination. He did not allow that car to be side-tracked anywhere. At the destination he assisted in the unloading of the goods, accompanied the local truck and then he lived with that yarn night and day, taking hold to work it up into the valuable order secured. He filled this order ahead of time and secured a big trade on the strength of this record rush. This is what vital interest means. It means living with the business constantly. This manager did not let his vital interest stop with the mill, the help or the goods. He visited the market freely; cultivated the acquaintance of his customers; studied their peculiarities; and catered to their wants within reasonable limits. Frequently he adjusted their unreasonable limit to his own reasonable limit by his strong and friendly vital interest in their welfare. He knew that their welfare was his welfare. Still, he went another long way off from his mills to see what he could do for his trade. He studied the growth of his raw material. He watched it planted, raised, harvested, ginned, baled and shipped. He even purchased plantations that he might grow the best raw stock himself for his fine goods.

Ah, my friends, being vitally interested is a vastness of attention to business. It covers the field broadly, and do you think this man's interest ended here? No! He became interested in the wearer of his goods, the consumer, the very people who are making the wheels in his mill hum with success and just pride. So he is now cutting up and sewing some of his own goods. In the great future his policy may be sloganed, "From Plantation to Wearer."

His vital interest leads him into another field of operation; his business depends upon the purchasing power of the homes. Home building also builds the business. So he may often call a young man into his office; one who is working faithfully for him. This is about the conversation which takes place: "Charlie, you have been working for me three years, haven't you? You say you are 21 years old and getting $10.00 a week. Now, Charlie, I like your work, you have a good steady job here and you can stay as long as you work and keep up your vital interest for me. Pick out a nice girl, get married and settle down. Soon as you get married I will make your pay $12.00 per week and I will not stop there. There is a lot more ahead of you." He takes the humanitarian view of all that should go to make business good. He knows that this world should be one of rapid home-making and home-building. He realizes that the country can never prosper faster than the making of its homes. It is the foundation of business as well as that of the family. The good business man shows a vital interest in the homes of his help and encourages home-making.

What vital interest does for one man it can and will do for another. It is the stuff that transforms the man, the raw material, the manufacturing plant, the operative, the goods and the wearer into a unit—their interests are vitally one. No worker can afford to be other than vitally interested. What it does for the combination, it will do for the individual; for vital interest in any man enlarges the viewpoint; teaches how to work under disadvantages; how to grasp every fair chance; it grows fruit; fattens the pocketbook; fills the dinner pail, and blesses the home. It strengthens the old homes and builds new ones. Being vitally interested pays. It surrounds the business with satisfied home-building employers, home-making employes, and provides the largest available market. Try it!

WELFARE WORK THAT COUNTS.

On February 21, 1914, there was a gathering of different basketball teams representing the mill league of the Mount Vernon Woodberry Cotton Duck Company's mills. The reason for this gathering was that the winning team of this league was presented with a trophy cup by George F. Payne, superintendent of the Mount Vernon Woodberry Cotton Duck Company, president of the mill league, and a member of the house council of the Hampden Woodberry Neighborhood Association. This basketball league was formed through the efforts of Mr. Payne and Director

SUPERINTENDENT GEORGE F. PAYNE.

King of the Public Athletic League. The winning team was produced by the Number E Mount Vernon mill, which won by a small margin.

There has been much activity at the West Park Recreation Center since Mr. Payne, his overseers and employees have become connected with the welfare work at the building. At Christmas time the House Council gave a public Christmas tree to the children of Hampden and Woodberry. There were 675 little ones made happy by receiving a pound box of candy, a pint of peanuts and an orange each. In addition to this, each boy received a horn and each girl a beautiful doll. A fitting program had been arranged for the occasion, and Santa Claus came down the chimney, which was built on the stage of the auditorium of the West Park Recreation Center.

The money for this occasion was all raised by subscription, of which $100 was raised by the employees of the

different mills in mostly 5 and 10-cent contributions. The tree proved to be a success and was the largest entertainment ever held in Hampden. With the money that remained after paying for the Christmas treats the committee purchased baskets for the needy families of that section. Each of the baskets contained a good-sized chicken and the necessary vegetables and other articles to make a Christmas dinner for six persons. There were seventy baskets in all given out. Horace Burgee, a member of the House Council, furnished the automobile and had the pleasure of distributing in person many of these baskets.

On February 23 and 24, 1914, a play, entitled "Dad's Reunion," was given. In the tableau preceding the play

The Trophy Cup Presented by Mr. Payne.

Mr. Payne appeared in the role of Uncle Sam. The auditorium was filled on both nights, the receipts going towards the maintenance of the building.

Mr. Payne is at present organizing a baseball league, which will be composed of a nine from each mill. The young men are showing remarkable interest in all of these sports. As a matter of course, Mr. Payne is very much liked by the employees of the different mills, and his support to the welfare work of the Hampden Woodberry Neighborhood Association is showing excellent results.

A business man in a European country is desirous of taking over the sole agency or representation for the country in question of a reliable and large American factory producing all kinds of cotton prints. An American consular officer states that this merchant has been esablished for some years and is able to handle this particular line of business successfully. Correspondence with the inquirer may be in English. Bank references are furnished. In writing address the Bureau of Foreign and Domestic Commerce and refer to file No. 12335.

Any weak lye may be used in saponifying fatheads.

THE PRESENT BUSINESS SITUATION IN THE BALKAN SECTION.

BY ARCHIBALD J. WOLFE.

In order to learn to what extent the business conditions in the Balkan States and in the Asiatic possessions of Turkey had been affected by the recent wars between Turkey and the Balkan allies, and between the allies themselves, the Foreign Department of the National Association of Manufacturers has made a canvass of over 200 of its correspondents in Europe and Asiatic Turkey, Greece, Servia, Bulgaria, Roumania and Austria-Hungary, inquiring minutely into the condition of business and agriculture in their districts and within their sphere of influence. A careful analysis of the reports received has brought out a number of interesting facts which are herewith presented.

With regard to the territorial rearrangement of the Balkan Peninsula, the final settlements and demarcations have not yet been ratified by all of the states concerned, but it may be roughly said that Servia has acquired a large territory to the southwest including a number of important cities, such as Monastir, Uskup and others, and free port facilities at Salonica, thus giving to that inland country an outlet to the sea, though in a very limited measure. Greece has been increased by accretion of territory to the north, including the city of Janina and the seaport of Salonica. The international conference has awarded to Greece several islands in the Aegean Sea including some which had been held by the Italians since the Italo-Turkish war. This award is likely to stand although the Turks have made a protest against it. The island of Crete has been finally annexed by Greece. To Bulgaria has been added a small strip of country to the south, a notable decrease of territorial acquisition as compared with the concessions the allies were ready to make before Bulgaria had quarreled with them. Still Bulgaria is now the only Balkan State which has sea ports both on the Black and on the Aegean Seas, her new territory including two available ports on the Aegean Sea, which will have to be connected with Old Bulgaria by a railway line, before they are of any use. Roumania, which has preserved neutrality throughout the war, invaded and assumed sovereignty over a small but exceedingly fertile strip of land in northern Bulgaria.

BULGARIA.

A canvass of thirty-nine correspondents of the National Association of Manufacturers in Bulgaria was made in the preparation of the analysis of Bulgarian trade conditions. Seven of them are connected with commercial organizations in Bulgaria, national and foreign, ten are banking correspondents in various Bulgarian cities, and twenty-two are heads of business houses and industrial enterprises.

Turkey was the seat of the war during the first portion of the Balkan troubles and Bulgaria did not suffer any damage or loss of business excepting as the result of the mobilization of troops. Business became stagnant. The second war was fought practically outside of the Bulgarian territory. The Roumanian invasion which led to the annexation by that country of the section along the northern Bulgarian frontier was pacific.

Collections in the territory of the old kingdom of Bulgaria are regular, but certain difficulties are experienced

*Extracts from American Industries.

in the newly annexed territory which has been the seat of a devasting war, and where the inhabitants had to a great extent lost their property or left their homes.

The new provinces of Bulgaria are 15,000 square kilometers in extent and are very fertile, producing cotton, tobacco and other crops. Bulgaria is now the only Balkan state which has an outlet on the Black Sea, as well as to the Aegean Sea, and this geographical advantage is bound to benefit the country. Foreign manufacturers and exporters have somewhat curtailed their credit terms to Bulgaria by drawing against documents. The Bulgarian manufacturers have not changed their credit terms.

SERVIA.

The services of thirty-three correspondents of the National Association of Manufacturers in Servia, including three in the new possessions of Servia, were availed of in the preparation of the brief analysis of the trade conditions of that country.

Correspondents state that business conditions in Servia were considerably perturbed during the war. The export trade of Servia was paralyzed due to the requisition of all rolling stock for military operations. Servia, however, has gained much in valuable territory. The tendency of the Servian trade is to favor English, French and German imports at the expense of Austria-Hungary. Agriculture is developing and the prospects for improvements in conditions are good. No loss of crops had been experienced. No failures of consequence occurred during the war, particularly as the moratorium act protected weak merchants. The country will make endeavors to colonize and cultivate the newly acquired territory.

The public debt of Servia has increased by about 600,000,000 to 700,000,000 francs. Seven to eight per cent premium is now paid for gold.

Previous to the recent war which has added a considerable and valuable territory to the Kingdom of Servia, the area of Servia was 18,650 square miles with a total population in 1910 of 2,911,701 persons. It was a country entirely surrounded by other states, and dependent upon its neighbors for means of communication, both in the case of imports and exports. The partition of the Turkish province that fell to the lot of the allies all but realized Servia's aspirations for an outlet to the sea. Salonica, for a time the bone of contention between Servia and Greece, soon after the fall of that city was definitely retained by Greece, but before these lines are in print an arrangement is expected to be ratified providing for free port facilities at Salonica to Servian goods with possibly a strip of land for a railway line to connect the Servian portion of the port with the hinterland.

GREECE.

Twenty-eight correspondents of the National Association of Manufacturers throughout Greece, have been canvassed in the preparation of the present analysis.

With regard to the situation in Greece, several banks concur in advising that the effects of the war on general business conditions have not been serious. The war and the troubles had lasted for about a year and a half, and the experience of the banks had been that the commercial bills have been regularly met by business people. Credit terms were somewhat restricted. The banks were disinclined to give much credit. Barely any failures were registered, as the moratorium decree protected non-payers. Still few business people excepting very small merchants took advantage of the moratorium.

British interests state that the effects of the war had been very much less harmful than expected, and that the crops were well up to the average. Payments had indeed been a little delayed, but not seriously. In the Athens district hardly any merchants took advantage of the moratorium act. In Patris quite a few business people availed themselves of the privilege. The prospects of the development of the country both industrially and agriculturally are described as good. The greater portion of the new territory is good agricultural country. The population of Greece has doubled, giving local industries greater scope.

TURKEY (EUROPEAN AND ASIATIC.)

Sixty correspondents of the National Association of Manufacturers in Turkey were addressed in order to compile an accurate analysis of present conditions in that country. Bankers representing all national affiliations, secretaries of chambers of commerce of various countries, importers and exporters throughout Turkey have cooperated with the Foreign Department of the National Association of Manufacturers in this connection.

Banking correspondents in Constantinople state that since the return of normal conditions business has become a little more brisk. During the war of Turkey with Italy, and for some time after the conclusion of that war, the Turkish commercial relations with Italy were entirely suspended. The resumption of these relations will work a change in the export trade of Turkey with Austria-Hungary and Germany. Business is expected to improve. Turkish export had practically been at a standstill, and in many territories the entire business was restricted to government supplies.

Other banks summarize the effects of the war on Turkey as follows: Increase of indebtedness to foreign countries, great loss of life, the loss of European provinces, and the postponement of many important projects in railway construction and industrial enterprises. Asia Minor is expected to develop greatly.

The Turkish Empire lost the greater portion of its European possessions, but the Turks emerged finally out of their troubles slightly better off than at the end of the first portion of the war.

When Bulgaria, dissatisfied even with its lion's share of the spoils of war, quarreled with its allies, Turkey reoccupied Andrianople and certain territory surrounding the city. This possession to Turkey, however, has more of a sentimental value than of real material benefit, the tombs of many deceased soverigns being located in the ancient city of Hadrian.

The analysis of the reports received by the National Association of Manufacturers gives rise to a substantial hope in the peaceful development of all of the countries involved, and it will pay the American manufacturers to study these markets. They are now purchasers of American agricultural machinery. Many other American products may be imported. The export trade of the United States is now at a point when we can no longer ignore a market because it is not next door to us or has not yet been fully developed. The entering of a developing market at an early stage means a secure foothold in times to come.

A thorough analysis of the canvass is being prepared in the shape of a pamphlet on the Balkan situation which will soon be published by the National Association of Manufacturers and will contain also a compilation of statistical data relating to the population, agriculture and commerce of all of the Balkan states.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

Perhaps the greatest difficulty which the Southern mills are encountering at the present time is that caused by the continuous differences between the New York future market quotations and the spot cotton rate at the mill. When a mill man has to purchase cotton at spot market rates of approximately 13¾ cents for spinnable cotton, and then find, when his goods reach the New York buyer, that he is expected to sell these goods on the basis of the New York future quotations, he is very apt to find his profits have reached the vanishing point, and then some. Most mills are working on orders rather than piling up stock goods, it seeming the better business to accept orders at a small profit than to run chances on manufacturing stock goods which may have to be held an indefinite period before they may be sold, and with possible price variation also to contend with.

J. H. Separk, secretary and treasurer of the Gray Manufacturing Company, of Gastonia, N. C., who was recently looking over the New York market in person, said that the shortage of good white cotton in the South is not exaggerated. In fact, in many cases it is not to be had, and spinners are in a position where they must get better prices in order to keep going. Other prominent mill officials reflect this same tone and add that the future prospects look bright to them and they are looking for better business in the near future.

The New York Cotton Exchange has officially adopted the government standard of cotton types, effective April 1, 1915, and while it is believed that this is a move in the right direction and one of the basic causes of complaint directed against the New York cotton market by the government, the *New York Commercial* and other prominent factors in cotton circles are indicating that this change should be effective in September, 1914, rather than April, 1915. The main cause of complaint, however, has not yet been touched. This cause lies in the fact that under the New York system of certification there is no grade identification of the individual bale. In round figures, each certificate calls for 100 bales, and the certificate shows that in the lot there are so many bales with the total number of bales in each grade indicated. Moreover, as there is no tag or mark on each bale to indicate its grade, the receiver of the cotton on contract, should he desire to ship out to mills any part of the cotton so received, must have all the bales resampled and reclassed, when this duplicated work could be avoided by placing numbered coupons in samples corresponding with the tag numbers on the bale, and then pay the certification bureau a charge for recertifying the cotton remaining in order that it may be made ready for tender. It is probable that under the new proposed Duke warehouse system this trouble will be largely eliminated, inasmuch as the actual cotton will not have to be delivered, and the warehouse certificate will give all the information desired about the staple itself.

One of the most significant items of news which would indicate the present prosperity of the Southern section is a recent announcement sent out by the Georgia Chamber of Commerce indicating that, in response to inquiries sent out among the towns in the state, nineteen cities and towns have replied that they wanted a knitting mill established in the town. Proposals for such establishments should be forwarded to the Georgia Chamber of Commerce, and from them can be learned of the offering being made by different cities and towns in the way of stock subscriptions, reduced taxes and other special inducements to encourage industrial improvement in this southeastern section. A complete list of cities and towns, with the industries most desired, may be secured from the Georgia Chamber of Commerce, Atlanta, Ga.

The change in the date of the American Cotton Manufacturers' Association Convention at the Waldorf-Astoria hotel, New York, from May 26th-27th, to April 27th-28th, will meet with approval from many Southern mill men who desire to attend the Boston Textile Show and wish to make one trip answer for both occasions.

The Bureau of Census has just issued its preliminary report for the month of February which indicates that the cotton growing states are still well up the line on cotton consumed, having utilized 243,184 bales during the month, and also show 12,306,311 active cotton spindles, which is an increase of more than 35,000 over the month of January.

Among the mill news of interest during the month may be noted that the Madaline Hosiery Mills at Ridgedale, Tenn., began manufacturing and expect to be in full operation within 30 days with a daily capacity of 1,000 dozen pairs of hosiery. This plant is a branch plant of the Davis Hosiery Mills, of Chattanooga, Tenn. Hosiery from this branch mill is taken to the main mill for dyeing and finishing. The new plant utilizes electric power and is heated by steam. The Davis Hosiery Mfg. Co. is one of the large enterprises of its class in the South and is capitalized at $500,000. It has plants at Fort Payne, Ala., and Wichita, Tenn., as well as the main mill at Chattanooga.

The Valdes (N. C.) Mfg. Co., has its new plant nearly completed and expects to be in operation by June 1st. It is reported that the management is in the market for a 50,000 gallon steel tank and tower. This mill will manufacture knitting yarns and will be equipped with 5,000 spindles electrically driven.

The Durham Hosiery Mill Co. has just let the contract for a new mill building to be known as the Durham Hosiery Mill No. 6. The Fiske-Carter Construction Company of Greenville, S. C., secured the contract and will begin work immediately. This company is also to build a big storage warehouse in Durham. Another contract recently let by the Durham Hosiery Mills Company, was for the erection of 15 tenement houses to be occupied by the operatives. About 200 persons will be employed in the plant and approximately 600 new spindles will be installed. The mill building is to be 420 by 106 feet while the storage warehouse will be 150 by 100 feet.

The Hawkinsville (Ga.) Cotton Mill Company has been organized with a capital stock of $75,000, by C. P. Gentry of Greenville, S. C., and associates. This company purchased the present mill at Hawkinsville, Ga., and will overhaul the machinery consisting of 3,000 spindles and 144

looms. It will also install 24 automatic looms. Mr. Gentry is general manager.

The Clinchfield Mfg. Co., at Marion, N. C., has incorporated with a capital stock of $500,000. D. D. Little is president of the company and other officers will be elected at an early date. This plant is to manufacture print cloths and is to be equipped with 26,000 spindles and 600 looms. Orders for this machinery have already been placed. J. E. Sirrine of Greenville, S. C., will have full charge as engineer and architect.

The Lexington (S. C.) Manufacturing Company has increased its capital stock to $400,000. It is rumored that this increase was made to allow for enlargements of the plant, although no official announcements have been made in this connection.

The Hannah-Pickett Mills at Rockingham, N. C., are to erect an additional mill building and 12 new operatives' houses. This company also expect to change over from their present steam plant to the electric drive system.

The Crown Cotton Mills at Dalton, Ga., are replacing 136 plain looms with Northrop looms. They have also recently purchased a new warp tying machine.

The Riverdale Cotton Mills at Riverview, Ala., will enlarge its cloth room with an addition that will cost approximately $10,000. George H. Lanier of West Point, Ga., is the general manager.

The Marlboro Mills, at McColl, S. C., recently placed an order with the Fales & Jencks Machine Shop at Pawtucket, R. I., for 6,000 spindles with which to replace old frames. They also ordered 16 roving frames from the Woonsocket Machine & Press Company of Woonsocket, R. I.

A new addition has been started at the Louise Mill at Charlotte, N. C., to be used as an opener room for preparing bales of cotton for the picker room. The space now occupied for opening cotton in the picker room will be utilized for eight additional pickers which are to be installed immediately.

The Troy (N. C.) Knitting Mill, contract for which was recently awarded to the R. A. Brown Construction Company of Concord, N. C., is now in process of construction. This mill will be 60 by 100 feet, three stories high with a dye house 60 by 40 feet.

The Charleston (Tenn.) Hosiery Mills have been organized with a capital stock of $50,000 and will erect a one-story building with basement and install knitting machinery for hosiery production. W. L. Eldridge is president.

The Bellwill Mills at Wilmington, N. C., are building six additional cottages for their operatives.

NEW ENGLAND MILL SITUATION.

Trade in cotton goods markets has quieted down to a considerable degree in the interval and the outlook for the mills is not so bright as it was at the opening of the year. Adverse weather conditions have delayed the development of the retail trade a great deal and many weak places in distributing quarters have been much talked about. The imports of textiles are beginning to show threatening totals, and the difficulties inseparable from a season where novelty goods predominate have assumed menacing proportions and have already led to drastic reductions in the effort to move out stocks that are ephemeral in styles.

Jobbers have held prices fairly steady on a great many staple goods but as mill contracts have run out it has been found hard to renew them at satisfactory prices. From week to week there seems to be trade enough to take the accumulated products of many mills and cancellations have not been so important as the requests to hold back goods to await finishing orders. The general belief in the trade that stocks are not large is well founded as to many cloths, but from week to week instances of delayed distribution come to light which show on analysis to be due to delayed or restricted consumption.

There has been little or no improvement in the very coarse end of the market. The tangled affairs of the largest duck organization are gradually being cleared up and it is now announced that the products of the Mount Vernon-Woodberry mills will be sold as heretofore through the old agents but under the direction of a trusteeship that will not be permanent. This assures more steadiness in prices but values in relation to cotton on all heavy duck lines are unconscionably low.

Much less than the normal amount of new building is going on and the uses for duck of many descriptions have been greatly restricted by general trade conditions. Some lines of osnaburgs used largely for cement bags are not in active demand and there is a glut of goods suitable for such purposes. Specialties in duck and light weight ducks of many kinds continue to furnish a considerable degree of employment but competition for late business is steadily growing sharper without regard to the high cost of good spinning cotton.

The other important weak spot in the markets which affects New England mills most seriously is found in the indifferent demand for late contracts of fine and fancy goods. Converters are uncertain of the styles that will predominate a year hence. They note that the demand is veering from very coarse heavy fancy cottons to very sheer cottons, yet the retail trade has been so slow that they cannot with safety begin the manufacture of the new goods for next spring. The effect of the new tariff law thus far has been indirect rather than direct, inasmuch as actual importations have not glutted the markets save on some extreme novelties, but the margin of profit for the mills is being affected adversely by the threats of what may be brought in at a time when business abroad is growing poorer and when foreign manufacturers may be very willing to accept business for the United States markets at very low prices to keep their own mills employed.

The demand for export has been light of late and recent transactions in sheetings for China and drills for India have been of a character that does not presage a large business for the long future. The high cost of cotton is preventing sales of goods in some markets.

There has not as yet been any united movement to bring about a curtailment of production but it is being talked of frequently as one of the possibilities. It is felt by manufacturers that cloths are being sold subject to the laws of supply and demand, while cotton remains very well sustained in price in the south. Mills are paying a cent a pound higher for the cotton they must have than cotton is quoted at in the exchanges and the margin between the quoted prices of future cotton and the prices for goods to be delivered is so wide as to be devoid of possible profit. As the cotton year goes on it is expected by manufacturers that there will be a gradual scaling down of future prices in anticipation of a new crop, but they expect to see spot cotton of good grades remain high. To meet this condi-

tion they feel that a careful restriction of output to orders will be necessary.

Many constructions of print cloths have declined in value in the interval. Spot goods are bringing a premium of from 1/16 to ⅛ cent a yard, but when mills try to induce the placing of late contracts they are forced to consider prices that are unprofitable. At Fall River there is a shadow of a labor trouble hanging over the industry, due to the deferring of demands of operatives for higher wages until spring. What will be done when warm weather comes is wholly uncertain. Conditions of business do not warrant advances in labor costs, but the unsettlement of labor is such that manufacturers are prepared for unreasonable demands of any kind. A small strike at the Pacific mills during the month resulted in the closing of a large part of the plant and the throwing out of work of more than 2,000 people. Similar eruptions are common.

Staple printed goods are being sold in moderate quantities and prices remain unchanged. Fall percale orders have been of fair volume. A moderate amount of business is coming along in twilled draperies. Printers of fine crepes, plisses and specialties are doing a good business from week to week, but without being able to build up any substantial sold to arrive list. Fine organdies, lace cloths, and intricate leno fancies from very fine yarns are being asked for in sample pieces and some fair sized advance orders have been placed. The tendency toward sheer goods is well marked, but there are a great many small unfinished orders for coarse yarn novelties still on the looms and reorders on these goods have been delayed by the late opening of the spring retail selling season.

Bleached goods of a standard character have held their values steadily and prices are likely to remain fixed on bleached muslins and similar merchandise for the balance of the season. Wide sheetings, pillow tubing, and pillow cases and sheets, are in steady demand and prices rule steady. Staple ginghams are under order in the largest mills for some weeks ahead. Dress ginghams as a whole are not satisfactory, the new demand being confined to a few cloths to retail at 10 cents a yard or lower. The very fine zephyr trade has been hurt by foreign competition as well as by the irregular influences of fashion, and mills are not well employed on this class of merchandise. Denims are ½ cent a yard lower than they were at the opening of the month and some of the smaller mills are not well engaged. On heavy working suit specialties mills can now make better deliveries than at any time for two years.

The larger units of manufacturing are well employed but managers complain of the lack of profit in business that is being done and the difficulty they find in securing late business at prices that are at all inviting. The amount of curtailment that is now going on is stated at Fall River and New Bedford, as well as in some Rhode Island mills, to amount to 15 per cent of the output. This has been increased by the stopping of looms as orders run out.

Finishing plants report fairly steady operations on goods to be used promptly but there is a lack of late business noted in nearly all quarters. The printers have been stopping some machines for a day or two at a time and the bleachers could do more work if it was available.

There has been an improvement among the machinery concerns but while many works are running full time they are not so well supplied with business that they could not do much more with larger forces. Machinery prices have been very inviting in the past six months and considerable work was accepted for occupation purposes. In addition to this there have been some new enterprises started, principally in the South, that will give employment for some time to come. There is a good call for additions of various kinds to weaving machinery.

The general attitude of manufacturers in the section is that a slow summer is at hand. The business is being complicated by the cotton outlook and by the certainty of further hard competition from abroad, particularly on the finer goods that are now being foreshadowed in the fashions. And to this the uncertainty regarding labor, and there is a combination of things for the moment that troubles the wisest heads in the New England field.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKET.

BY H. AND B. BEER, NEW ORLEANS.

The undertone of the market is steady with an advancing tendency owing to the moderate supply of cotton remaining in this country, because of large consumption in the United States, the continuance of heavy exports to Europe and on account of the backwardness of the new crop prospects, due to unseasonable cold weather in the Southern states.

All ideas of the crop of last year being 15,000,000 bales were dispelled by the last of the season reports of the Census Bureau, issued on March 20th. According to their returns the total number of bales ginned this season was 14,594,000 bales including 629,000 bales of linters. Last season the commercial crop was 14,167,000 bales, of which 602,000 bales were linters. The crop by states, including linters, is as follows:

	This Season	Last Season
Alabama	1,536,000	1,367,000
Arkansas	1,078,000	805,000
Florida	70,000	60,000
Georgia	2,456,000	1,889,000
Louisiana	457,000	393,000
Mississippi	1,310,000	1,049,000
Missouri	67,000	56,000
North Carolina	869,000	935,000
Oklahoma	881,000	1,057,000
South Carolina	1,460,000	1,260,000
Tennessee	402,000	289,000
Texas	3,946,000	4,888,000
All other states	62,000	40,000

Now that the size of the crop has been ascertained, the question is how much of it America can spare for export to Europe. The American mills will need about 6,000,000 bales for home consumption. Therefore it is evident that not more than about 8,600,000 bales will be available for shipment to foreign mills, which would be about the same as exports of last season, which were 8,611,000 bales. But exports to Europe thus far this season are about 500,000 bales larger than they were to even date one year ago; consequently they are running on a basis of about 9,100,000 bales for the season. It is evident, under the circumstances, that unless exports commence to fall off compared with shipments after this time last season, the American markets will be exposed to the possibility of manipulation this summer, and the American spinners may find it a difficult task to secure their wants for the remainder of the season.

Surface conditions, however, do not reflect the proba-

bility of a scarcity of cotton this summer, especially when the big discount at which May and July contracts in New York, compared to the value of middling cotton in the South, is taken into consideration. Nevertheless, it is only necessary to refer to the final disposition of the March option in the Northern market to realize the danger existing in the selling the market short under such conditions. March in New York today (March 21st) closed at 13.05, while July contracts in the same market closed at 12.02.

The facts in hand denote that the South has less cotton to market today than last year by 318,000 bales, despite the crop to have been 427,000 bales larger than last season's yield. This is due to the movement to market being larger to date than one year ago by 745,000 bales. The following comparatives will give a clearer insight into the matter:

	This Season.	Last Season.
Total crop	14,594,000	14,167,000
Marketed to date	13,099,000	12,354,000
Unmarketed	1,495,000	1,813,000

As to the new crop situation, prospects are somewhat backward owing to unseasonably cold weather. The thing to fear now is that wet weather may come at planting time, in April, which would delay planting generally.

THE KNIT GOODS MARKET.

Reports from the carded yarn hosiery trade are rather conflicting. Some manufacturers are reported to be sold up to next September and October, while others are said to be sold up for May and June, and are getting no new business for delivery after June. Manufacturers of heavy weight underwear report they are well satisfied, and there will be no material quantity of underwear carried over until next season. In the northern part of the country stocks were pretty well cleaned up, and the recent cold weather during the first of March made all kinds of heavy weight underwear in demand, and the quantities remaining in the distributors' hands were greatly reduced. In fact, this cold snap brought some encouragement to selling agents for heavy weights in both cotton and wool in the way of further orders. This new activity was considered encouraging, but was not overestimated.

It is believed that extra efforts will be needed to book the usual business in hosiery this year, as the state of the hosiery trade seems to be somewhat unsettled. There is a larger inquiry for colors this season. In cheap stockings, navies and grays are in demand, with tans quiet. In silk goods the immediate business is active in special colors, such as taupes, greens and other shades. Shaker and rough neck worsted and all-wool sweaters were not selling well, and the season, it is reported, has been a very unfavorable one for this class of goods. Union goods in cotton and wool are pretty well cleaned up. In cheap balbriggans the report from the underwear market in the early part of the month showed an active business for the spring season. It is rare indeed that jobbers sold so much light underwear so late in the year as was sold last fall. It was believed that with an early spring there will be a scarcity of certain goods this season.

The middle of the month showed scant improvement in knit goods lines. Agents for a number of lines of heavy underwear and sweater coats were still complaining of demands from buyers to change orders in ways that made difficulties for the mills. In sweater coats the cancelling was not prominent, but there was a lack of business. In underwear the selling activity was at a standstill. The duplicate spring business had not started in any large way. Hosiery mills had a good business for the next few months, but beyond July 1st the situation was somewhat irregular.

As the month closes, agents for cotton lines in hosiery are expecting an improvement in business shortly. More interest is evidenced from large Western centers. Underwear manufacturers are getting some duplicate business on light weights, and manufacturers of carded yarn hosiery are reported to be busy with orders that will keep them running to full capacity until May or June. Selling agents for sweater manufacturers say there is a new field for mercerized yarns if American manufacturers of sweaters can be aroused to see the opportunity. Department stores are importing foreign made sweaters of mercerized yarns, weighing from 8 to 12 pounds to the dozen, and some of them retailing for $4.00 each. These foreign mercerized goods are selling freely, and as yet no American manufacturer has offered anything in that line. One manufacturer is reported to be experimenting with silk plaited on mercerized yarn to sell for about $5.00 retail, and another is experimenting with artificial silk plaited on mercerized yarn. It is believed that if American manufacturers can sell a silk plaited garment for profit at $5.00 retail, the imported mercerized cotton sweater selling at a similar price will not be in the running. J. H. Fedden, of O'Callaghan & Fedden, who as been making a personal study of hosiery trade conditions in the leading countries of Europe, Asia and Africa, is of the opinion that manufacturers in this country have nothing to fear in the way of foreign competition, even under the new tariff rates. Mr. Fedden took special pains to investigate the different kinds of hosiery selling in the different countries, bringing samples of many kinds home with him. Mr. Fedden reported mills in Germany to be very busy on orders from other countries and deliveries very late. Prices are high, and have been for a long time. Manufacturing costs over there have gone up as well as in this country, and in his opinion the 25-cent stocking obtainable now, even under a lower duty, would not equal the same price article under the old and higher duty. A sudden fashion change toward some fancy article, such as lace hosiery, might materially increase the imports, but nothing need be feared on staple goods.

One of the interesting side lights on the present business situation, from a knit goods standpoint, has been brought out by C. B. Carter, secretary of the National Association of Hosiery and Underwear Manufacturers, and printed in their official organ, *The Knit Goods Bulletin*. In response to a circular letter issued by Secretary Carter, some very interesting facts were determined as to the present business situation, together with a number of members' views as to the busniess future.

In response to the question, "To what extent, if any, has your business been affected by the change of administration and the subsequent laws that have been enacted?" 72 members report; 48 members reported they had not been adversely affected; 3 members report business very much better. In response to the question, "Is labor as fully employed as prior to the passage of the new tariff?" 54 members report no change, 3 members state labor is more fully

employed, 9 members claim labor is not as fully employed as formerly, and 3 members report 25 per cent decrease.

The third question asked was: "Is the volume of wage payment as large as prior to the passage of the new tariff?" To this question 49 members reported there had been no reduction in wage payment; 12 members state wage payment has been increased; 9 members state wage payment has decreased from 10 to 25 per cent.

The fourth question was: "Are buyers placing their orders as freely and in as large amount as previous to the presidential election in 1912?" To this question 32 members report buyers are placing orders as freely and promptly as possible; 5 members claim orders are coming in more freely than formerly, and 33 members state buyers are not placing orders are freely as formerly.

Replying to question five, "Is foreign competition materially affecting your business and output?" 40 members report they have not felt the effects of foreign competition; 17 members state that while they anticipate severe foreign competition, it has not yet developed; 10 members claim they are losing business on account of the importation of foreign goods.

Question six was: "Can you give any instances of the detrimental effect of Oriental competition?" To this question 64 members report they are not affected by Oriental competition, if such exists; 2 members contribute the loss of business to Oriental competition.

Perhaps the most interesting question of all was question seven: "What is your opinion for the outlook for business, based upon your own experience, or your knowledge of existing conditions?" To this question 28 members report good business prospects; 4 members state the outlook is very, very good; 15 members claim prospects are fairly good; 23 members report that the outlook is not very bright; 1 member states the situation is rotten. Extracts from a few of the letters received follow as a further explanation of the conditions confronting the knitting manufacturers:

* * *

"In the class of goods we make, the cheap grades of ladies' hose, we consider a high tariff less advantageous than the present one, but it makes little difference, except the high tariff protects the speculator more. There are many other things that hurt the manufacturers more than changes of tariff on cheap goods. The jobbers of the country will not give a legitimate advance on goods when cotton is high, but look for a reduction as soon as it goes off."

* * *

"We believe that as soon as the necessary readjustment due to the tariff and currency bills is completed that business will be found very satisfactory in nearly all lines. We believe underlying conditions are sound, and that it is more a question of timidity and conservatism that withholds considerable business from being done at present.

"We expect to have a good year, and, as a matter of fact, believe the underwear manufacturers as a class will be affected very little by the changes in law recently passed."

* * *

"We think that the outlook for future business is very good. We do not know how we could think differently as long as there is plenty of business to go 'round. There is hardly a doubt in the mind of any citizen that the administration is a capable one in many ways, and while the tariff bill was in making we naturally were interested and directed our efforts in such a manner as to make its provisions favorable to our business and the manufacturer in general, but now that the bill is passed we are willing to operate under its provisions.

"We are very optimistic as to the future, as we believe that we can be of more benefit to the world and ourselves in this frame of mind than being a pessimist, because the world hates a man that squeals before he is injured, and such is the position of a pessimist.

"We think that buyers will keep on buying in small lots, which increases the cost of production very much. People with money will not invest in mill stocks, as they have no confidence in the future. This will curtail expansion very much or bring same to a standstill."

* * *

"The outlook for business between now and June 1, 1914, to our mind, does not look at all promising to the American manufacturer, but we do not want to be a 'calamity howler' and imagine conditions worse than they are. We are trying to educate ourselves to feel optimistic for the future, and are endeavoring to make ourselves believe that after June 1, 1914—that is, for next fall business—business will pick up considerable, as we feel by that time the operation of the tariff and currency laws will be perfected to such a degree that confidence will be restored and business will go ahead for the American manufacturers, although we do not think the prosperity of American mills will strike its natural stride until after the first of January, 1915.

"However, there is so much rich American blood in our veins that we believe there is no one man, set of men or any political party that can retard the progress of this great American nation; we are going ahead in business, no matter what happens. Of course, we will have these little setbacks now and then, but they are only stepping stones to greater prosperity for the American nation."

* * *

"We are this morning in receipt of your circular letter of the 20th inst., requesting us to answer several questions contained therein as to present conditions of our business. The answers of these questions are taken from the books of our company, and can certify that they are accurate in every respect. We do not know for what reason you are making these inquiries, but if it is the purpose of the association to discredit the present conditions in the hosiery business and to blame same on the political outcome of recent events, we think that, instead of showing any tendency of a slowing up of business, that we should put aside all political aspects and congratulate ourselves on the splendid showing of nearly every line of business which is properly conducted, which we find is the general outcome of the past year. Everyone who deserves to be seems to be prosperous, with the exception of the woolen and worsted business, which seems to have been peculiarly affected by the tariff agitation and uncertainty of the past year. But even in this line of business we are assured, by friends who are identified with same, that mills making high-grade goods are busier today than they have been for a long time.

"In writing the above we are only hoping that the agitation which has existed for the past six or eight months will cease, as it cannot but hurt business if it continues. If you will refer to recent issues of R. G. Dun & Co.'s weekly re-

port, which shows an unbiased statement of business conditions throughout the different sections of the country, we think that you will feel with us that the outlook is most encouraging for continued prosperity and good business during 1914."

THE YARN MARKET.

The yarn market for the past month has frequently been spotty, but sometimes dull and sluggish. Certain buying interests were inclined to doubt the stability of prices. They lacked confidence in present conditions, particularly in the status of the raw material market. Underwear manufacturers were buying a few yarns for late delivery at the opening of the month, but, as a rule they were not greatly anticipating their needs. Some knitters were buying carded yarns for delivery from June until September, and Southern mule spun cones of slightly tinged stock were sold for summer delivery on the basis of 21½ cents for 10's. Southern frame spun carded cones sold on the basis of 21½ cents for delivery in April and May and later deliveries on the basis of 21 cents. Combed yarns were rather quiet at the opening, two-plies extremely so.

Unfavorable weather conditions also had a tendency to lighten the amount of business done in yarns during the first part of March, and undoubtedly the weakness of the New York cotton market had also a contributing influence toward the same end. Weavers were not buying yarns during this period, the largest sale reported being 100,000 pounds of 8's three-ply at 17¾ cents. Weavers were generally bearish on yarn prices, and indicated their belief that cotton would go still lower and that yarn prices would be apt to drop more than cotton.

The middle of the month found buying largely of a hand-to-mouth character. Combed yarn continued very quiet in the Philadelphia market, and this applies particularly to the two-ply yarn, of which the production seemed to be in excess of the needs. Prices varied widely; 40's two-ply were sold at 38 to 42½ cents; 50's two-ply on cones were sold for 44½ to 46 cents; 60's two-ply sold for 49 to 52½ cents; 80's two-ply, for which there was not much demand, sold for 69 cents; Eastern 60's two-ply combed peeler cones sold for 51½ cents, but the general price was 52½ cents. Dealers who make a specialty of mercerized yarn were reported as being quite confident that these yarns are coming back, and inquiries for small quantities of 70's two-ply and 80's two-ply on cones have already been reported. In the New York market buyers had taken the stand that as long as they could pick up yarns as they are needed, and as long as prices are below what the spinners would quote for either spot or forward delivery, there was little reason for placing any forward contracts. In the Boston market most buyers have continued to operate in a hand-to-mouth fashion, and the uncertainty regarding the future is probably the most unsettled factor in the whole situation. Prices in this market were not as firm as they were at the beginning of the month, but it was hard to trace any definite declines in value. Concessions from current quotations were more numerous and prices seemed more irregular in consequence.

The closing of the month found underwear manufacturers getting some duplicate business on light weights and buying yarns for fall delivery. Purchasers of 22's, 24's and 26's Southern frame spun carded cones in quantities ranging from 5,000 to 35,000 pounds, for deliveries beginning promptly, were common. Prices, however, showed a tendency to weaken slightly. Toward the close, sales of 24's Southern frame spun cones were made for 24 cents, which was ½ cent under previous prices for May delivery. Sales of 22's were made for 23½ and 24 cents; 26's sold for 25¼, 25 and 24½ cents. Combed yarns continued quiet and prices weak. Southern frame spun combed peeler sold on the basis of 25 and 25½ cents for 10's. The demand for two-ply combed peeler was again light; 36's two-ply sold for 36 and 37 cents; 40's two-ply from 37¾ to 40 cents; 45's two-ply for 41½ cents; 50's two-ply brought 45 cents; and 60's two-ply sold for 49 and 51½ cents. A prominent knitter, in discussing the combed yarn situation, is reported as saying that he was not buying any fine two-ply yarn, but was trying to sell his goods and finding it hard to move them. In his opinion the fine yarn end has been somewhat overdone and the prices run up to a point where the knitters were forced to substitute cheaper yarns. He also believed that fine yarn goods were not satisfactory to the great majority of consumers, that the wearing qualities were not commensurate with the price paid, and more substantial goods will have to be made by the majority of manufacturers who have been making fine yarn hosiery. Inquiries continue for mercerized yarns, but no large amounts are being sold. There is little improvement in the weaving situation.

Following are recent quotations on the Philadelphia market:

Southern Single Skeins.

3s	18½@19	10s	19 @20
12s	20 @20½	14s	21
16s	21½	20s	22½@23
26s	24	30s	26

Southern Two-Ply Skeins.

4s to 8s	18½@19½	10s	19½@20
12s	20 @20½	14s	20½@21
16s	20½@21½	20s	22¾@23
24s	24	26s	24½
30s	25¾@26¼	40s	30½
50s	36 @36½	60s	44 @44½

Carpet and Upholstery Yarns in Skeins.

9-4 slack	20½	8-4 slack	20
8-3-4 hard twist	18½@19		

Southern Single Warps.

8s	19 @19½	10s	20¼@20½
12s	20½	14s	21
16s	21½@22	20s	22½@23
24s	24	26s	24½@25
30s	26	40s	31

Southern Two-Ply Warps.

8s	19 @19½	10s	19½@20
12s	20 @20½	14s	21½@22
16s	22 @22½	20s	23
24s	24 @24½	26s	25
30s	26	40s	31
50s	31		

Northern Two-Ply Carded Peeler Skeins.

20s	24½	22s	25
24s	25½	26s	26
30s	27	36s	29½@30
40s	32	50s	37
60s	46		

Two-Ply Combed Peeler Skeins.

20s	29½	24s	31
30s	33 @33½	40s	38 @42
50s	44 @46	60s	49 @52½
70s	57 @60	80s	67 @69

Southern Frame Spun Yarn on Cones.

8s	20	10s	20½@21½
12s	21 @21½	14s	21½@22
16s	22 @22½	18s	22½@23
20s	23 @23½	22s	23½@24
24s	24 @24½	26s	24½@25
30s	26		

Northern Mule Spun Carded Yarn on Cones.

4s to 8s	21½@22	10s	22 @22½
12s	22½@23	14s	23 @23½
16s	23½@24	18s	24 @24½
20s	24½@25	22s	25 @25½
24s	26 @26½	26s	26½@27
30s	28	40s	33 @33½

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	27 @27½	12s	27½@28
14s	28 @28½	16s	28½@29
18s	29 @29½	20s	30 @30½
22s	30½@31	24s	31 @31½
26s	32 @32½	30s	35 @35½
36s	37 @38	40s	38 @40

COTTON MANUFACTURING.

CLOTH ROOM METHODS AND MACHINES.

BY C. T. FALLIN.

We finished with the book records proper in the last chapter but as no outline of efficiency, such as I am now trying to give, would be complete without a further consideration of report forms, I here supplement three forms, Figs. 7, 8 and 9, for consideration. Fig. 7 is an efficient form of daily report which is susceptible to much expansion and improvement but in a general way its present form will give the desired information and prove an ample check to the mills record system for a daily report.

This report is filled in by taking the bale record, Fig. 4, and going systematically through each account and entering under columns marked "yards baled," "pounds baled," "bales put up," "yards 2nd class," "standard average weight" and "actual average weight" the information readily obtained from the bale record.

If we have several bales put up of the same style, we may easily add the various bales together and put the totals for that day down in very small pencil figures directly under the last ink figures in the "yards baled" and "pounds baled" columns.

Let me digress here long enough to show my lack of prejudice by remarking that in this one very small thing hinges the greatest weakness of this system for if we are not very careful to insert these minature pencil figures or in some other way indicate the bales already reported, we might do one of two things: either fail to report some bale at all on this daily report, Fig. 7, or else have the same bale appear on two separate daily reports, and in either case we should wake up some beautiful morning to find that our mistake has caused great misery to the superintendent and much inconvenience to the mill. Because of such possible happenings I advise to recheck these reports when complete, having some assistant call the figures and check in person each bale reported, at the same time looking carefully for errors in addition, which in this system is not so very likely to occur.

Having the first three columns of this last section listed properly we may proceed with the next four. The fourth column of this section is "Yards 2nd class." In the method of obtaining the yards and percentage of seconds, mills vary greatly. Some get the yards at the grading tables as each piece is graded; others are content with (what I consider the best method by far) waiting until the goods are baled and figuring upon the baled product. I admit this method is not as accurate for a daily record but for a weekly or a monthly record it is more so. Whichever system a mill uses is immaterial to us as we insert here in this column "Yards 2nd class," the exact yardage of second class goods shown on the bale record, Fig. 4, as indicated by the grade letter or other grade marks; or else from the graders record, the yards shown thereon as having been put in seconds, having the yards of seconds made, also the total yards put up.

A simple sum in percentage ascertains the information for the next column, viz., the percentage of yards of seconds. The next, standard average weight may need explanation. The standard average weight is what the goods are supposed to weigh. It is the contract yards per pound that the buyer expects for his money, and is usually expressed with one, and in cases of extreme light weight,

CLOTH ROOM DAILY REPORT
BLANK COTTON MANUFACTURING CO.

DATE _____ 19____

STYLE NO.	PAT.	YDS. RECD. FROM WVE. ROOM	LBS. RECD. FROM WVE. ROOM	YDS. BALED	LBS. BALED	BALES PUT UP	YDS. 2ND CLASS	% 2ND CLASS	STND. AVE. WT.	ACTUAL AVE. WT.
TOTALS										

_____ OVERSEER

Fig. 7. Cloth Room Daily Report.

with two intregal numbers, succeeded with a decimal point and usually two decimals, something like 4.50, which means four and one-half yards to each pound of goods. In some cases, for instance, heavy duck, osnaburgs, denims, tickings, etc., the average weight is sometimes referred to as so many ounces per yard, also expressed in decimals, as 8.25 ozs., meaning eight and one-quarter ounces in every lineal yard. Also in very wide, heavy goods, such as sail duck, and especially burlap, the figure represents the ounces in each *square yard*, not in each *lineal yard*. Now to return to Fig. 7, in this column marked standard average weight we place the required weight, whether yards per pound, ounces per lineal yard, or ounces per square yard, just what the goods were sold for and this information as well as the other details of construction, should by all means be ready at hand either at the top of each page on the bale record, Fig. 4, or better still, written once on the blank tab page of this style of goods. This obliterates the necessity of referring to the style cabinet each time we want to know the weight or any other construction detail. We have only to look at this tab sheet for the information desired. We now put the required or standard weight in its proper column, but as no mill has ever or ever will reach perfection, we can seldom if ever, put the actual average weight down the same as the standard weight, *hence these two columns*. To obtain the actual average weight we must for yards per pound divide the total pounds into the total yards, thus obtaining the figure desired. To illustrate: 2256¼ yards ÷ 412 pounds = 5.47. Now we will suppose that we are making 5.50-yard goods, we thus find that today our goods are within .03 of the right weight, which is as close as we may reasonably expect to get it, and would readily be passed as O. K. by the mill management, selling agent, or buyer. Therefore we insert these two figures in their respective columns, and proceed in the same manner with the next in order until all are finished. To figure goods into ounces per yard is a trifle more difficult and by various mills is figured in various ways, all of which are approximately correct, the only question being to decide which is the shortest and easiest understood method. I give here the two most common rules and add a third which I believe to be the best:

(1) Pounds × 16 ÷ yards. Illustration: A bale with 1046 yards weighs 625 pounds. 625 × 16, the ounces in one pound, = 10,000 ounces. 10,000 ÷ 1046 = 9.56 ounces per yard.

(2) Yards ÷ 16 into pounds. For example: 1046 yards ÷ 16 = 65.37. 65.37 ÷ 625, the total pounds, = 9.56 ounces per yard.

(3) Pounds ÷ .625 ÷ yards. Illustration: 625 pounds ÷ .625 (which is the decimal equivalent of one sixteenth of a pound) = 1,000. 1,000 ÷ 1046 = 9.56 yards per pound.

Where the square instead of the lineal yardage is considered the process of figuring the average weight is a little less comprehensive, yet no more difficult. This system is very seldom used, but to help the fellow who may sometime be up against it, as I once was, I will give just one rule. There is a long and difficult way of squaring everything from the scale beam to column post, that will get it very accurately, but a more simple way is as follows: Width ÷ 36 × the lineal yards, figured as in any of the three rules given. Suppose we have 54-inch goods and desire the ounces per square yard. 54 ÷ 36 = 1.5. 1.5 × lineal yards = figure to use in our calculation, which is so simple as to hardly appear worthy of further comment.

I think I have made my meaning clear as being opposed to basing averages on small pieces, yet in a modern room it is very necessary to sometimes figure a small piece. Take, for instance, when a sample cut is to be sent, or when a new syle is going on the looms, we must get some ideas as to what the average weight is going to be. In the case of the sample we are likely to select one many points off standard, for reasons later mentioned, and in the case of a new style, the first cut should be weighed not as a basis for changing the yarn number, but as a check on the calculation made, when goods were started. If the average is decidedly off, figure over the calculation again, then if an error is found of course it would be necessary to change the yarn, but if the piece weighed is a few points from standard, it will be found that the bale will average nearer right in nearly every case.

In weighing a small piece of goods the most important matter is to get the net weight accurate, and this cannot be done by weighing on a large scale such as is used for weighing bales, nor yet on scales such as are used in the ordinary store. We must have something that will register small fractions of an ounce (at least 1/16 and 1/32 is better) very accurately. One pound either way on a bale of medium weight goods will hardly be discernable but 1/16 of an ounce will readily show on a few yards.

If we are going to weigh a few yards, we could use any of several good rules. I will illustrate only two:

(1) Yards × 16 ÷ pounds × 16 + ounces + fractions. Example: We have 40 yards of goods which weighs 9 pounds, 15 ounces and ¼ ounce Then

$$\frac{40 \times 16 = 640.}{9 \times 16 + 15 + .25} = 4.02.$$

(2) I like this second method much better for it is simpler. It is based upon the decimal equivalent (.625) of one ounce, by finding our decimal equivalent and adding it as a decimal to the pounds we have a simple proposition that anyone can easily understand. Take the example illustrated before, 15.25 ounces × .625 = 9.53125, but as our 9.5 is only a decimal part of our 9 pounds representing the 15.25 ounces we simply move our decimal back to the right one point and use .95, throwing the remainder away. Experience teaches that it is so small by this time that it does not alter results. We now have the simple proposition of dividing 40 yards by 9.95, and we find this same average 4.02. A little practice makes it very simple and seldom is it necessary to even figure for the decimal to add to our pounds. 8 ounces × .625 we soon learn = .50. 4 ounces × .625 = .25 and 12 × .625 = .75. To this we can add the fractions of an ounce by simply dividing .625 by the known fraction. For instance ½ of .625 is .0312 and our 25 or 50 or 75 plus this .03 = the decimal to use with our known pounds.

Furthermore, a few moments' study will show how to apply this rule to the figuring of ounces per yard or ounces per square yard on a small piece. Rules already given will assist.

Some may think this daily report the wrong place to refer to average weights, and a good many mills have an antiquated and very poor method of keeping averages and seem to go at the matter wrong end first. Many of the mills where I have been as overseer, or have visited, figure all their averages from a very small piece of goods, usually

a cut or a double cut, osnetimes from a very few yards, and they make no calculation until after the goods are made, when it is then too late to repair the damage.

I have known some mighty good mills to risk the average weight coming right from a few yards or a cut of goods and wake up to the fact that they were 20 to 30 points off on the bale and to find that these goods must be held up from application on the order, and sold at a decided loss, if sold at all.

Some times, when the variation means a large loss to the mill, the cloth room is expected to juggle its records a little in order to make the average weight look better and get the goods through. Yes, sir, the cloth room is a mantle of charity that covers a multitude of sins and it is interested vitally in any sin it is called to bear, and I do not consider my work complete until I have attacked every abuse heaped upon it, and tried in my humble way to offer something better. I may be considered an egotist, but I set out to clear up some of the abuses the cloth room and my fellow overseers as well as myself are called upon to bear, and I shall not be quite satisfied until I have attacked every one I see.

One of the greatest abuses ever put on a cloth room is to ignorantly or otherwise base this very important work of figuring averages on a small piece of goods and then expect the cloth room to get it through so as to apply on the order some way. To figure the average from a small piece of goods from a single loom is never and can never be accurate for a number of reasons.

Any manager who uses the single piece system for averages has found the average report almost perfect one day and has seen it go to the eternal "bow-wows" the next. Under these circumstances many mill managers are inclined to accuse the cloth room overseer who prepared the report of dishonesty and incompetency. Few have gone deeper and looked for the fault elsewhere.

It has so far been clearly shown that I do not approve of hinging so important a thing as figuring averages on a single piece of goods. What then is better? I contend that to expect the cloth room to keep the weights is another evidence of saving at the spigot and wasting at the bunghole. It is a case of desiring to save the horse when the stable door has ignorantly or carelessly been left open, and to hold your innocent cloth room man guilty for no other reason than that he is the general scapegoat of the mill is working at the wrong end. It is too late to correct a mistake after it is made, and almost criminally wrong to hold an innocent man guilty of something he had no part in and by no means could avoid. The carder and spinner are accountable for the weights. The cloth room man is but a beacon light on a dangerous shore pointing the way to safety.

In any case of averages the larger the number of yards the more accurate the average, so make it a rule never to change the spinning on any less than the several bales shown on the Daily Cloth Room Report Fig. 7, and even then not until sure that this report is correct or until after two or three days it is found registering the same discrepancies.

However, this chapter is getting too long and the editor will register a kick if I don't quit, therefore, I will leave the further discussion of Fig. 7 for the next chapter.

DESIGNS FOR FANCY COTTON FABRICS.

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART NINE.

Illustration R, Fig. 39, represents a cloth which is a combination of the 2/2 basket and the plain weave. Each repeat of the pattern is made up as follows:

Light Blue	38	6	6	38	= 88
Dark Blue	4			4	= 8
White	6	6	6		= 18
Threads per repeat					114

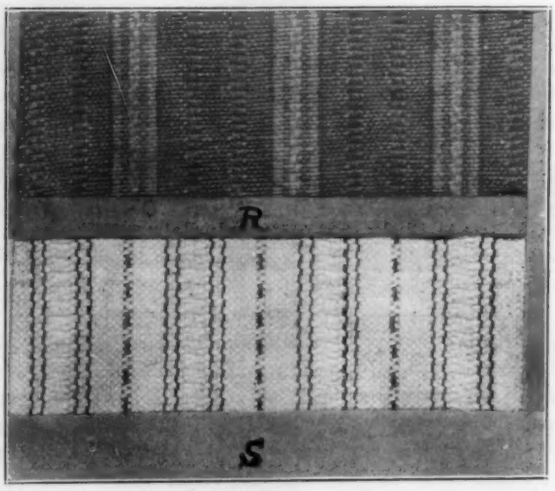


Fig. 39.

and the cloth contains 120 threads and 40 picks per inch. The 114 threads are represented in two portions in the design at T, Fig. 40, 56 threads in the upper portion and 50 in the lower portion, and the draft for each portion appears immediately underneath at U, while the weaving plan is shown at V. With the exception of the dark blue threads, which work singly, and the white threads which form the basket and work in threes, the warp threads are double, and in all places on the design the single, double and triple threads are represented by single, double and

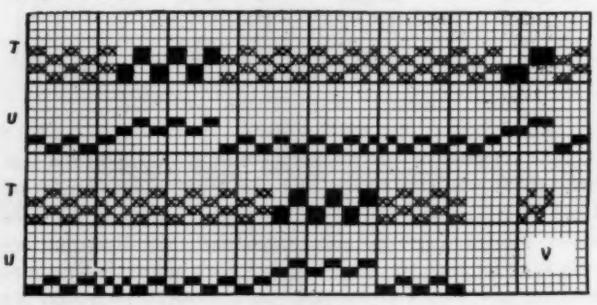


Fig. 40.

triple lines. All the basket parts are shown in solid marks. In the draft at U the threads are shown as being drawn separately through the harness mails, but a more economical arrangement would be to draw the threads double through the mails where they work in pairs. This would reduce the number of heddles approximately by one half, facilitate the weaving, and enable the weaver to take up the broken threads more quickly. The tappet may be composed of

two plain blades, two repeats to the round, working in conjunction with two blades 2/2 and 2/2; or an ordinary plain tappet and two scroll tappets may be employed.

A more elaborate scheme of coloring has been adopted to produce the cloth which is represented at S, Fig. 39, and an additional weave, the 4/4 basket has been introduced in conjunction with those two which have been used to produce pattern R. There are 88 threads per inch and 48 picks per inch in the pattern S, and the warping particulars are:

White	8	4	16	4	16	8	= 56
Light Brown	2	2	2	2			= 8
Light Blue					2	2	= 4
Dark Blue					2		= 2
Threads per repeat							70

The light and dark blue threads in the center of the white stripe are shown in solid marks at W in Fig. 41. If the section W were doubled over between the 4th and 5th picks,

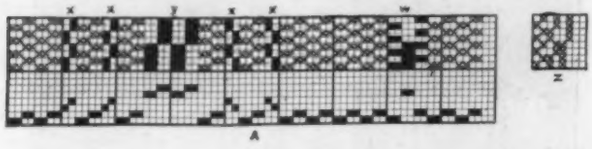


FIG. 41.

the marks on the first four picks would fall into the blanks of picks 5 to 8 and vice versa. This principle of making designs is largely practiced for dices and for small crepe weaves, and some very pretty effects result. The principle consists in placing any small motive on a few threads and picks, and then of reversing the small effect weft way, warp way, or both, according to requirements.

The light brown threads weave 2/2 as indicated at X, Fig. 41, and the solid marks at Y represent the white threads which weave in 4/4 basket order. The remainder of the threads weave plain but in pairs or double warp order. Six harnesses are required to weave this cloth as illustrated by weaving plan Z. Here again, a big reduction in the number of heddles would obtain if the double warp threads were drawn two in each mail instead of singly as exemplified in the draft at A.

(To be continued.)

THE ROVING PROCESS.

BY H. C. W.

THE CONES.

The purpose of the compound was discussed in the last article. It was also shown that the winding revolutions of the bobbin are obtained from the cones. A study of these cones will now prove very interesting. To illustrate, we will suppose that we are using a 1 inch empty bobbin and making a 4 inch full bobbin. It is evident then that we are to increase the diameter of the bobbin 300 per cent over its original or empty diameter.

In a true pair of cones the sum of the diameter of the top and bottom cones will always be equal if taken at the same relative points on each cone. The size and length of the cones is a point which is arbitrary and is dependent upon the amount of space available in which to place them. Cones having a sum of diameters of 9 inches and 30 inches long are perhaps the most common.

Now as we are to increase the diameter of the empty bobbin 3 inches while running a full set this means that for each inch of increase the cone that will have traveled 10 inches gives an increase in diameter of the bobbin of 1/10 inch for each inch of belt traverse.

This statement must not be misunderstood as it sometimes is. It is true that the increase in diameter of the bobbin is of the same amount for each inch of belt traverse, but the proportional increase of diameter is *not* the same but varies, and it therefore follows, that the speed of the bottom cone and bobbin must be reduced as the bobbin fills, and this reduction must be in inverse proportion to the proportional increase of bobbin diameter. This statement may seem misleading but a clearer understanding can be had from the application of this fact later.

In order to show the method of designing a pair of cones we will assume bobbin diameters of 1 inch empty and 4 inches full and a sum of diameters of 9 inches and 30 inches as the length of the cones. We will also assume a top cone speed of 200 r.p.m. The top cone is driven at a constant speed depending upon the size of the twist gear.

The diameters at the starting or first point on the cones are in proportion to the square roots of the diameters of the full and empty bobbins. That is, T.D.C. : B.C.D. : : $\sqrt{4}$: $\sqrt{1}$ or T.C.D. : B.C.D. : : 2 : 1. So we find that the diameter of the top cone in this case must be twice the diameter of the bottom cone. As their sum is 9 inches we must divide 9 inches into two numbers, one of which is twice the other. If we divide 9 into (2 + 1) 3 parts and take 2/3 as one number and 1/3 as the other we will have satisfied the conditions. This gives a top cone diameter of 6 inches and a bottom cone diameter of 3 inches.

At the full bobbin or finishing point of the cones these diameters are reversed and the diameter of the top cone is 3 inches and of the bottom cone 6 inches.

For each inch increase in diameter the cone belt must move 10 inches towards the large end of the bottom cone. So when the bobbin has become 2 inches in diameter the cone belt must be 10 inches from the starting point and have traveled one-third of the length of the cones. When it is 3 inches in diameter the belt must have traveled two-thirds of the full distance and be at a point 20 inches from the starting point. When the bobbin is 4 inches in diameter, the belt must have traveled 30 inches or its full traverse.

The top cone speed is 200 r.p.m. Its diameter at the start of the bobbin is 6 inches, and the diameter of the bottom cone at the same point is 3 inches. From this data the speed of the bottom cone is found by the following equation:

$200 \times 6 \div 3 = 400$ r.p.m.

This gives a basis upon which to work to determine other speeds and diameters. The speed of the bobbin when the bobbin is empty or 1 inch in diameter will be of the same relative speed as the bottom cone. When speaking of speed of bobbin it must be understood that only the winding speed is meant. Therefore we may consider the bottom cone speed as relative bobbin speed, over that equal to the spindle speed.

When the bobbin is 1 inch in diameter, or empty, a speed of 400 r.p.m. of bottom cone will give the correct winding speed to the bobbin. When the bobbin has reached a diameter of 2 inches its surface speed must be reduced to one-half of what it was when the bobbin was empty in order to have a correct winding speed. This is necessary

because the surface speed of a bobbin 2 inches in diameter is twice as great as one 1 inch in diameter.

For the same reason when the bobbin is 3 inches in diameter its speed must be one-third of the original speed. When 4 inches in diameter the speed must be one-fourth of the original speed to obtain the proper winding speed.

There are three possible or probable combinations of drums of varying diameters which will give speeds of variable amounts. The first is a pair of drums whose diameters are reduced or increased the same amount for each inch of length. They are known as straight faced cones. Fig. 9 shows a pair of such cones. Below them are shown the

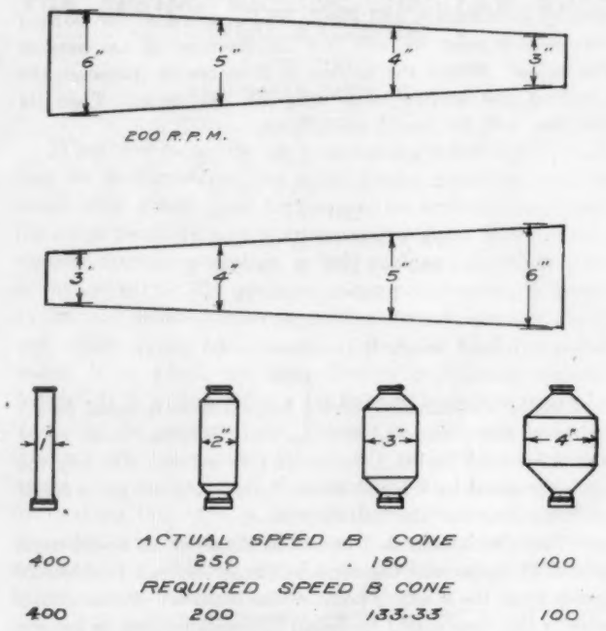


FIG. 9. A PAIR OF STRAIGHT FACED CONES.

diameters of the bobbin at different points of cone diameters.

We saw that 400 r.p.m. bottom cone would give the correct winding speed at the start of the bobbin. When the bobbin is 2 inches in diameter its speed must therefore be 200 r.p.m. When it is 3 inches in diameter its speed must be 133.33 r.p.m. When 4 inches in diameter its speed must be 100 r.p.m It follows then that any pair of cones which does not give these speeds at the correct points are not practical nor theoretically correct.

For each increase of 1 inch in diameter it is found that, in this case, the cone belt must move along 10 inches of the cone surface. Straight-faced cones 30 inches long and 6 inches in diameter at the large end and 3 inches in diameter at the small end, have an increase or decrease in diameter of 3 inches in 30 inches or 1 inch each 10 inches. In Fig. 9 then, we have, when the bobbin is 2 inches in diameter a top cone diameter of 5 inches and a bottom cone diameter of 4 inches. The speed of the bottom cone when the belt is at this point would be:

$$200 \times 5 \div 4 = 250 \text{ r.p.m.}$$

But it is found that a speed of 200 r.p.m. only is required. Now when the bobbin is 3 inches in diameter, the cone belt must be traveled 20 inches and the top cone diameter is then 4 inches and the bottom cone diameter 5 inches. The speed of the bottom cone would then be:

$$200 \times 4 \div 5 = 160 \text{ r.p.m.}$$

But at this point a speed of only 133.33 r.p.m. is required. When the bobbin is 4 inches in diameter the cone belt is running on a top cone diameter of 3 inches and a bottom cone diameter of 6 inches, having traveled 30 inches or the full distance. The speed of the bottom cone is then 100 r.p.m., which corresponds with the required speed at this point.

It is seen therefore that at the start and finish of the bobbin, the straight-faced cones give the correct winding speed, but at the intermediate points, however, they do not give the correct speeds. It follows therefore that they cannot be used. If some suitable arrangement could be made, whereby the cone belt could be moved varying distances for each inch of increase in diameter, then it would be possible to adopt them. For instance to obtain the correct winding speed for a 2 inch bobbin the cone belt would have to be in the middle of the cones or 15 inches from the starting point. Thus for an increase of the first inch we have used 15 inches of the cones and have only 15 inches left to work the bobbin to 3 inches and then to 4 inches in diameter. This would call for a rack of variable pitch or some such other attachment. This, of course, would be clumsy and perhaps costly and as other more simple arrangements can be made, it is not used.

The next method which might be adopted is one having a straight drum driving onto a cone having a straight outline. Using a drum speed of 200 r.p.m. a sum of diameters of 9 inches at the starting point, it is found that a drum, 6 inches in diameter and a bottom cone 3 inches in diameter

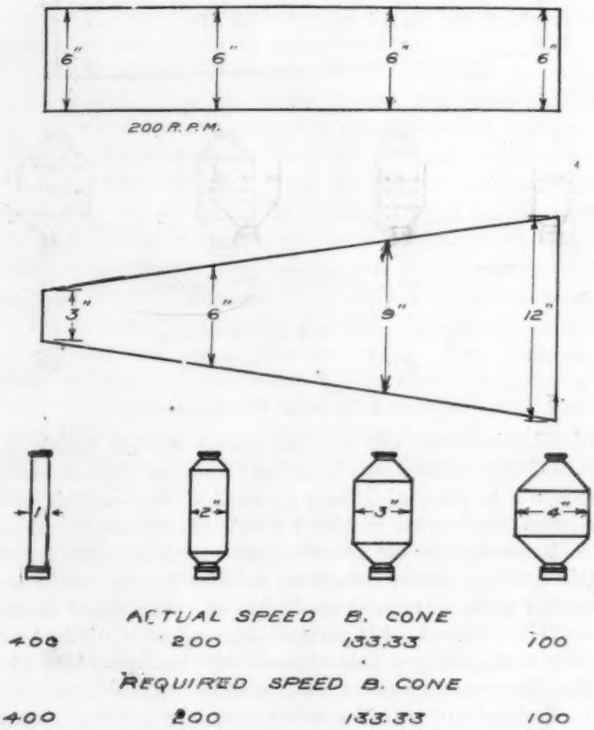


FIG. 10. A COMBINATION OF DRUM AND CONE.

at the starting point, will give the correct speed of 400 r.p.m. to the bottom cone, for a bobbin 1 inch in diameter. When the bobbin is 4 inches in diameter we found the bottom cone must have a speed of 100 r.p.m. and its diameter would be found thus:

$$6 \times 200 \div 100 = 12 \text{ inches.}$$

Therefore we have a cone 3 inches in diameter at the starting point and 12 inches in diameter at the finishing point, and at these two points it satisfies the conditions of speed. It remains to see if they satisfy the conditions at the intermediate points. As we are now considering a straight-

faced bottom cone it remains to connect these two points of the cone by straight lines as in Fig. 10. This gives an increase in diameter of 9 inches in 30 inches, or an increase of 3 inches for each 10 inches of belt traverse. Thus when the belt has reached a point 10 inches from the starting point and when the bobbin is 2 inches in diameter, the cone belt is running on a bottom cone diameter of 6 inches and the speed of the cone at this point will then be equal to

$$200 \times 6 \div 6 = 200 \text{ r.p.m.}$$

which is found to be the required speed for a 2 inch bobbin. When the bobbin has reached a diameter of 3 inches, the cone belt has traveled 20 inches along the cone and is then running on a 9 inch diameter. The speed of the bobbin at this point will then be equal to

$$200 \times 6 \div 9 = 133.33 \text{ r.p.m.}$$

which is the required speed for a 3 inch bobbin.

This combination of drum and cone therefore satisfies

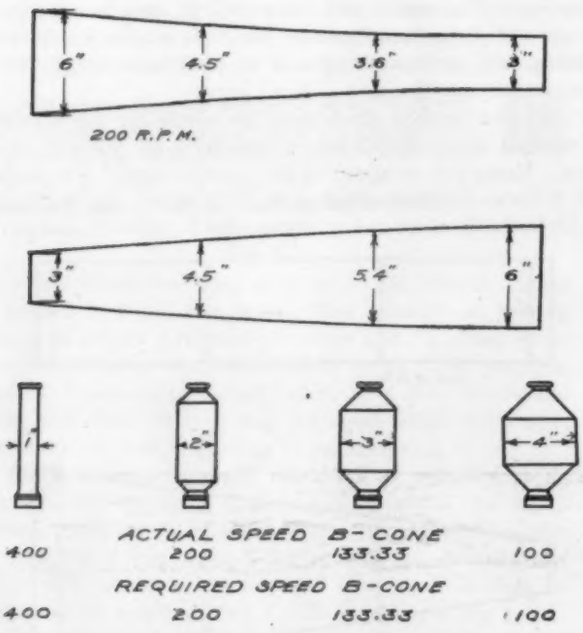


FIG. 11. A PAIR OF CURVED CONES.

all conditions and will give the correct winding speeds to the bobbin. It can readily be seen however that an extra cone will be required to take up slack in the cone belt and another small drum to give the belt the correct direction. With a rather limited space in which to place these parts, this has not proven practical, considering the one other method most universally used, that of curved-faced cones.

This latter method is perhaps the simplest. It is nothing more than making a pair of cones with outlines which will give the correct speeds at the various points.

To illustrate we will consider cones for a 1 inch empty and 4 inches full bobbin, a sum of diameters of 9 inches, a length of 30 inches, and a top cone speed of 200 r.p.m. Such a pair of cones are shown at Fig. 11. The diameters of the top and bottom cones at the starting point are in relation to the square roots of the full and empty bobbins, and, as in the other cases, will be 6 inches and 3 inches respectively. This gives a bottom cone speed of 400 r.p.m for the empty bobbin. The speed of the cone when the bobbin is 2 inches in diameter, or when the belt has traveled 10 inches along the cone must then be reduced to 200 r.p.m. because the diameter has been increased to twice its original amount.

The sum of the diameters of a true pair of cones, must, at all points, be the same and in this case must be equal to 9 inches. The solution or method of finding the diameters at these points involves a slight algebraic equation which can, however, be easily understood. As the sum of the diameters is equal to 9 inches, it follows that the diameter of the top cone must equal 9 inches minus the diameter of the bottom cone, and the diameter of the bottom cone must equal 9 inches minus the diameter of the top cone.

Now suppose we assume the diameter of the top cone to be (9 inches — B), B representing the diameter of the bottom cone. Then if we multiply the speed of the top cone by its diameter and divide by the speed of the bottom cone at any point we will find the diameter of the cone at that point. When the bobbin is 2 inches in diameter the speed of the bottom cone must be 200 r.p.m. Then its diameter will be found as follows:

$$\frac{200 \times 9 - B}{200} = B$$

$$200 \times (9 - B = 200\ B.$$

$$1{,}800 - 200\ B = 200\ B.$$

$$1{,}800 = 400\ B.$$

$$\text{from which } B = \frac{1{,}800}{400} = 4.5 \text{ inches.}$$

That is, the diameter of the bottom cone is equal to 4.5 inches at this point and the top cone diameter must equal 9 — 4.5 = 4.5 inches. To prove this we will multiply the top cone speed by 4.5 and divide by 4.5 and we get a speed of 200 r.p.m. for the bottom cone.

When the bobbin is 3 inches in diameter its speed must be 133.33 r.p.m. and the cone belt must be in a position 20 inches from the starting point. The diameter of the bottom cone in this case would be found in the same way as before.

$$\frac{200 \times (9 - B)}{133.33} = B.$$

$$200 \times (9 - B) = 133.33\ B.$$

$$1{,}800 - 200\ B = 133.33\ B$$

$$1{,}800 = 133.33\ B + 200\ B$$

$$\text{from which } B = \frac{1{,}800}{333.33} = 5.4 \text{ inches}$$

And the diameter of the top cone would be 9 — 5.4 = 3.6 inches.

In the same way the diameters at a point 30 inches from the start would be found to be 3 inches for the top cone and 6 inches for the bottom cone, which would give a bottom cone speed of 100 r.p.m. This would be found to be the correct winding speed for a bobbin 4 inches in diameter. This pair of cones will give the correct speed for winding at all points. The speeds at intermediate points could be found by the same methods, and from them, diameters computed for any intermediate point.

This method is more simple than the drum and straight-faced combination. It occupies less room, automatically takes care of the slack in the belt, requiring no additional cones, and is cheaper to install. In practice it is found that the theoretical outline computed as above will not work satisfactorily, due to the fact that the bobbin of roving is more or less spongy, and also, that in laying the coils upon the bobbin side by side, there are small cavities of less diameter made between each coil, into which the next layer

of roving sinks as it is wound onto the bobbin. This does not increase the diameter as much as it theoretically should, and therefore a theoretically designed pair of cones will not give correct winding speeds but need to be slightly altered.

Cones are also made slightly longer than the required length in order to allow a small amount to go and come on. All bobbins must be of the same diameter else here and there we may find slack or tight ends.

(To be Continued).

KNITTING DEPARTMENT.

THE SPRING NEEDLE CIRCULAR KNITTING MACHINE.

BY WILLIAM DAVIS, M. A.

When one considers the comparative simplicity of knitting as performed on the latch needle machines, and the speed with which those frames can be worked, thus insuring large production, it is surprising that the spring-needle circular machine continues to hold such an important place in the industry. The machine under consideration is known by various names; some term it a French circular frame and others a German circular frame, so that the safest course is to adopt the term French or German circular frame. It is undoubtedly a continental invention and continues to be produced by French and German machine builders, who supply it continuously to knitting manufacturers all over the world. Undoubtedly the best known firm for making this type is Messrs. Terrot Sohne, Cannstadt, Germany, who are large exporters. So intimately has this firm become associated with the machine that it is generally known as the "Terrot" machine, and the cloth made from it is often termed "Terrot" fabric.

Whatever may be said regarding the merits or otherwise of the latch needle machine as compared with the bearded needle frame, the knitting expert has little difficulty in differentiating between the fabrics made on the two machines, and for quality of work has little hesitation in stating his preference for the product of the spring needle frame. The contention is that the latch needle forming the stitches each individually on its own needle tends to produce minute irregularities and to give the cloth a comparatively raw appearance. In the spring or bearded needle the stitch formation is more of a collective nature, and the resultant cloth is more regular and has a better "body." The case seems to have its analogy in the weaving industry, where one distinguishes between fabrics woven on different looms by a subtle quality known as "cover," a quality not to be discerned by the uninitiated, but readily discovered by the expert. There are other explanations of the great popularity of the spring needle circular frame, which, in respect to stitch formation, are perhaps of greater importance than the high quality of the fabric. It is outstanding with reference to its capacity for producing designs which extend the application of the fabric to a large diversity of uses. The development of the fancy cloth is one of the noticeable features of the present-day knitting industry, and it is to the credit of the Germans that they have acquired the facility and devised mechanism for working out elaborate figured patterns for this type of machine. Alongside of this advantage is to be placed that which results from a bulkier and more stable cloth. If the knitted structure has to be employed with success in the intermediate and outer articles of wear, it must be more consistent in texture and be more solid in handle.

A full working view of the machine under consideration is given in Fig. 1, which represents the mechanism as it is erected and driven in a factory. Compared with other types of circular machines, this frame displays considerable complication of parts. From an examination of the illustration it will be seen that the fabric F proceeds downwards and is wound onto the rollers P. The yarn is placed above the machine on large bobbins B, from which it passes through a stitch regulating device to the needles N. In circular machines we distinguish between those which cause their stitch-forming parts to revolve, and along with them the fabric, and those machines where the latter parts are stationary and the thread guides revolve.

For the "Terrot" machine the thread guides and yarn are stationary, and the needles, fabric, etc., revolve. One advantage of this arrangement is that the worker can stand always in the same position and note the quality of the fabric as it comes around. If the needles are stationary, the minder has to be constantly walking around his machines on the lookout for defects, and some serious imperfections may have proceeded quite a long way before being noticed by him. Further, when the bobbins are stationary they can be all the more conveniently replaced when emptying, and so stoppage and loss of time is avoided. The whole machine is hung by a strong bar A screwed into a horizontal beam. These beams can be erected to run the whole length of the factory and the machines screwed up all the way at short intervals, one being divided off from another by a strong upright pillar.

The machines are driven from an overhead shaft by a belt which passes over the pulley W, the machine being set in motion by a convenient clutch arrangement. The illustration shows quite clearly the device for winding up the fabric as it is being worked. The whole frame T revolves with the fabric and travels supported on the fixed ring S. This ring has at its center a toothed wheel, which works into another connected horizontally to a rod at R, so that when the frame revolves the rod is made to revolve continuously. This turning movement causes the lever L to rise and fall, this turning the rollers by means of a ratchet at K. The length of this lever can be adjusted shorter or longer so as to wind on less or more cloth, as required. The fabric ultimately reaches the roller P, where it is wound on until the maximum thickness is attained, the roller being gradually pushed down by the successive rolls of fabric.

The part marked M is termed the sinker wheel. As the name indicates, it contains the sinkers which come onto the yarn to sink the new thread between the needles. The sinker wheel revolves on its own axis and controls the move-

ments of the sinkers. The needles are situated horizontally at N, being fixed so as to radiate from the center of the machine with the springs or beards upward. Directly above the letter V is placed the stitch regulator, which forms a most important feature of this machine. Owing to the complication of parts, it is not possible to distinguish some of

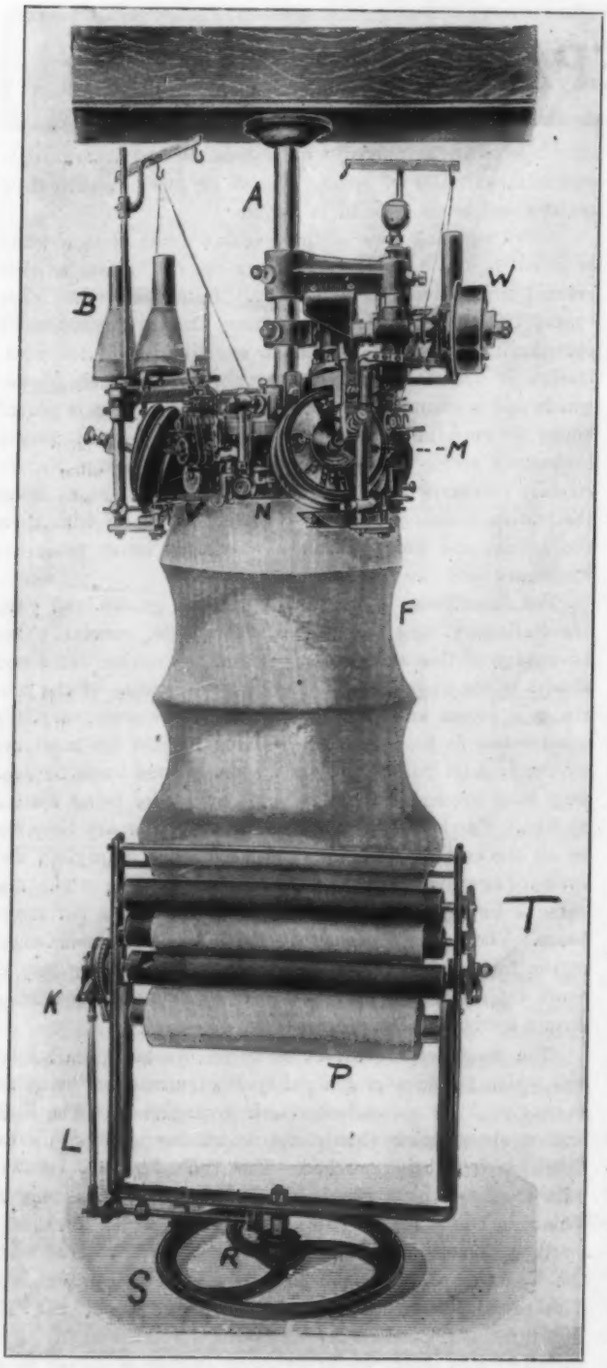


FIG. 1. GENERAL VIEW OF THE "TERROT" MACHINE.

the most vital sections of the mechanism which it will be necessary to thoroughly understand before the principles of designing on this frame can be demonstrated.

THE YARN REGULATOR.

There can be no doubt that the high quality of fabric produced on this machine is to some extent due to the excellent manner in which the thread is served to the needles. In general, the amount of yarn received by the needles of a knitting machine depends entirely on the pull of the needle; it takes more or less, just as it is regulated to draw, this regulator being made at the cam which gives the needle its knitting movement. In the "Terrot" frame, however, it is not the needles which regulate the amount of yarn taken, but the yarn is passed through an arrangement which measures it off exactly in the quantity required by the needles, this quantity depending on the gauge of the cloth, and on whether it is required to be worked tight or slack. The device is shown at Fig. 2, and consists of a train of three-toothed wheels, A, B and D, arranged one above the other, as shown. The train receives its motion from the movement of the needles N of the frame as it revolves. The teeth of wheel D work into the shanks of the needles N, and as the latter move with the turning of the frame and wheel D revolves in the direction of the arrow. Wheel D gears into the inner portion of wheel B, which revolves

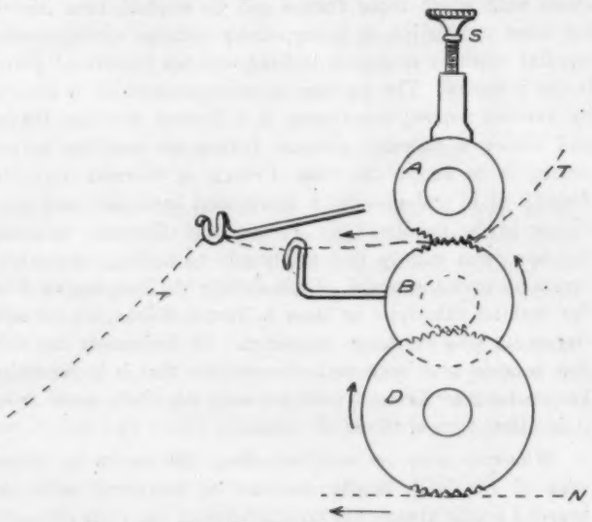


FIG. 2. THE YARN MEASURING DEVICE.

also in the direction of the arrow, and, in its turn, works into wheel A. It will be noticed that the thread T passes between the teeth of wheels A and B as they revolve. The screw S, shown above the wheel A, is turned so as to raise or lower it. When in its lowest position the teeth of wheel A work deep into the teeth of wheel B, and as the thread has to pass around all the teeth of both wheels, a longer length is served to the needles. When wheel A is drawn into a higher position, the teeth scarcely touch, and a much shorter length of thread is drawn through. The screw S can be readily adjusted so as to make the work stiff or slack, but the presence of the yarn regulator serves another important function.

Frequently, when the yarn is issuing from the bobbin, there is a hitch of one kind or another which draws the thread tight and often breaks it. A machine without a yarn regulator would show the marks of this unequal strain in the fabric, and the needles might press off their stitches before a breakage of thread could be noted. The device under consideration has an attachment for stopping the frame when the thread breaks before any pressing-off can take place. The advantage of the yarn regulator is specially noticeable in the case of soft yarns. These, when presented directly to the action of the jacks and sinkers, are constantly being broken and their working rendered

difficult. When they are first dealt with by the thread regulator, they are introduced gradually and passed into the knitting action of the needles in such a form as to reduce breakage to a minimum.

PRINCIPLES OF LOOP FORMATION.

In order that the method of loop formation may be more fully explained, a section of the chief parts involved is given at Fig. 3. This is the machine as seen from above, where the axis A is the center, and the other portions are arranged around the circumference. The chief parts marked will be recognized as N, the needles; J, the jacks; YR, yarn regulator; PW_1 is pushing back wheel No. 1;

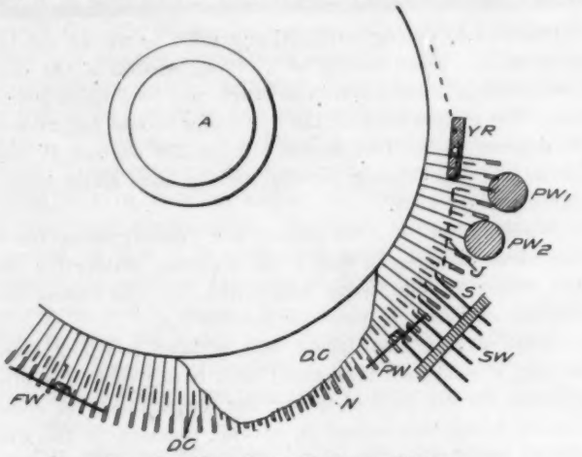


Fig. 3. The Loop Forming Parts.

PW_2 is the pushing back wheel No. 2. The sinkers S are shown protruding from the sinker wheel SW, and the presser wheel PW is arranged above the needles. The discharging cam DC is shown, and the finishing wheel FW. The needles and jacks revolve with the machine, and the other parts are stationary. To form the loop the yarn requires to be treated in turn by the parts named according to the stage of formation. When it passes through the yarn regulator, as already explained, it is measured according to the size of loop required. It then proceeds to within the reach of the sinkers, which are controlled in their movements from the sinker wheel. The latter receives a continuous rotating motion directly from the center of the machine, and as it rotates it pushes out its sinkers between the needles so as to secure the yarn and sink it in loop form between the needles of the frame.

An examination of Fig. 4 will show the true form of a sinker S, and its relation to the jack J, during the loop formation. The sinker, it will be noted, is provided with a hook at the end which serves a double purpose; not only is it enabled to sink the yarn between the needles of the machine, but by means of its hook it draws the thread under the needle beards, so that pressing of the beards and knocking over of the old loops can take place at once. The presser wheel PW is a circular disc with a plain edge fixed directly above the needles in such a way that all the needle beards which pass under the wheel are firmly pressed into the grooves, so that the discharging cam DC pushes forward the upright jacks, which, in turn, push the old loops onto the needle beards. As the stitches proceed farther, the discharging cam pushes the jacks still farther out till the old loops are pushed over the needle ends and the new yarn drawn through them.

The finishing wheel FW is placed at the angle shown, under the needles and behind the fabric, and, by virtue of its position, pushes the work farther out so as to insure that all the loops are thoroughly formed and none caught on the needle beards. The push-back wheels, PW_1 and PW_2, shown at the start of the series of parts, perform the work of pushing back the fabric from the needle heads onto the needle shanks. This enables the new thread to be laid in front of the loops just concluded, the new loops having to be kept distinct from the old stitches during the operations of pressing and knocking over of the course. The pushing-back wheels are arranged directly under the needles, the second PW_2 being set farther in than the first PW_1. Both of these wheels, by virtue of their respective positions, have the cloth coming against them, and in this way it is pushed back onto the needle centers, directly in front of the jacks J.

A side view of the essential parts concerned in loop formation is given in Fig. 4, where will be distinguished the sinker S, the spring needle N, the upright jack J, and the fabric F proceeding downwards. The hooked end of the sinker is seen to have sunk the new loop between the needles and to be drawing it under the spring of the needle. It ought to be mentioned that the latter part of the operation is partly due to the position of the sinker in its own wheel, for immediately the loop has been drawn under the needle beard or spring, the sinker leaves the needle because of the continued revolution of the sinker wheel. It is the sinker wheel, or rather the cams inside it, which control the out-and-in movements of the individual sinkers. The jack is shown in two positions—the upright and the forward positions.

In the dotted position the jack is completing the knocking over of the loop. The presser wheel will have acted before this and have pressed the spring of the needle just long enough to enable the jacks to place the old loop on

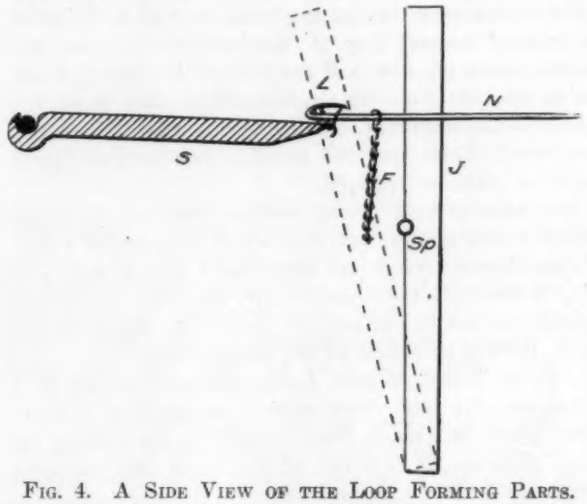


Fig. 4. A Side View of the Loop Forming Parts.

the needle beards. The jacks rest with their bottom ends on a ledge, and are encircled around the entire circumference of the frame, with a spring (sp.) which exerts inward pressure on all the jacks, so as to bring them back to their upright position immediately the discharging cam ceases to work them. The needles N are not cast in leads, but each reposes in a groove accurately cut out in the needle bed, the needles being firmly held in their places by a metal piece which can be screwed and unscrewed so as to enable

the worker to repair with alacrity any broken needle. These plates are in small sections, each section being screwed down on a score or so of needles.

The parts just mentioned are arranged in the machine as indicated, and all act together to form one row of loops. The series of parts, considered together, comprise what is known as a "Feed," and this feed can be duplicated several times around the circumference as desired. A very usual arrangement for common factory use is a two-feed machine, one feed being arranged directly opposite the other in the machine. Thus, if the frame runs at 30 revolutions per minute, we shall have 60 courses of loops formed each minute. For the finer gauges of machine a four-feed frame is frequently used, but it will be readily understood that the problems of adjustment are considerably increased.

Dyeing, Bleaching and Finishing.

THE MANUFACTURE OF ARTIFICIAL SILK FROM COTTON.

BY H. R. CARTER.

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DYEING ARTIFICIAL SILK.

Artificial silk is usually dyed in the hank in vats or becks. The vat or beck most commonly met with is a long, strong, pitch pine box, open at the top and fitted with a steam pipe below a perforated false bottom. The steam may be blown in direct, but it is better to use a closed steam coil with the necessary drain connections.

In dyeing hanks in the simple dye vat, the hanks are spread upon sticks or glass rods. These are usually straight, but are sometimes bent to keep the yarn under the surface of the bath. The hanks are dipped into the bath, raised and lowered in the liquor a few times, and then left in the bath, with the end of the stick resting on the edges of the vat. The next stickful is then introduced in the same way, and when all have been entered, leaving a space between each to prevent entanglement, the first is lifted by two men, standing one at each side of the vat. One of these men thrusts a stick through the hanks, and when the other has grasped his end, they lift the hanks so that they are well turned on the stick, and the part of the yarn that was resting upon it is now in the bath. The other hanks are treated in the same way, and the silk is said to have had "one turn." These men then go on to give the yarn "three turns" or more, as required.

One form of hank dyeing machine sometimes used consists of a semi-circular vat, over which is arranged a pair of disks, between which are suspended a pair of rods carrying hanks. As the disks revolve the silk is carried through the dye liquor, and, as there is no motion of the hanks, there is no chance of any entanglement.

Another ingenious yarn dyeing machine consists of a rectangular dye tank, over which is a traveling arrangement, which, in passing from one end of the tank to the other, picks up the rods full of silk, turns them over and drops them back into the tank again.

Among the most suitable dyes for dyeing artificial silk are Basic, Benzo and Katigen Colors (Bayer) and the Chlorazol (Read-Holliday). Artificial silk, being pure cellulose, dyes as easy as cotton, but unless all chemicals are thoroughly washed out, it is hard to get even shades. Such artificial silk must, however, be dyed at a much lower temperature than cotton, and the greatest care is required owing to its fragility when wet. For this reason it must be handled most carefully.

Previous to dyeing, artificial silk must be wetted out in warm water. Soap should be avoided, because if the silk contains metallic salts, insoluble soaps may be formed in the fiber. The temperature of the dye liquor should not exceed 120 degrees F. for Chardonnet silk or 150 degrees F. for Glanzstoff. The dyeing process usually lasts about three-quarters of an hour.

Nitrocellulose or Chardonnet silk distinguishes itself from other varieties, in that it has a certain affinity for the basic colors without being mordanted, but the fastest results are obtained by previous mordanting.

When dyeing Chardonnet silk without previous mordanting, a cold bath is charged with 5 per cent of acetic acid and the silk worked in this for ten minutes, the color solution being then added in several portions to the dye and the temperature raised to 120 degrees F. When mordanting artificial silk, a bath is charged with about 4 per cent of tannin, according to the depth of the shade to be dyed, and the material worked two hours at 100 degrees F., lifted out, extracted, and then worked in a fresh bath charged with 2 per cent of tartar emetic for thirty minutes, cold. If the material is taken through the old mordanting bath after dyeing, the fastness of the shade is improved.

In applying benzo colors to the Chardonnet silk, add to the bath, according to the depth of the shade required, some 5 to 15 per cent of Glauber's salt, enter the goods, lukewarm, and warm up to 120 degrees F.

The dye bath is prepared for dyeing with Katigen colors as follows: First, dissolve the dyestuffs. The simple brands are dissolved with the same amount of sulphite of soda crystals as color taken. The extra brands with double the amount in a little boiling water, but never in the whole liquor. Then for the dye bath employ, according to the hardness of the water and the depth of the shade required, from 2 to 8 per cent of soda and from 10 to 60 per cent of Glauber's salt crystals, or from 5 to 30 per cent of common salt. Boil the bath with the soda and skim off if necessary. Then add the solution of color and sulphite of soda, boil again, and add the Glauber's salt.

In applying Katigen colors to Chardonnet silk, allow the bath to cool down to 120 degrees F., enter the silk and dye in the cooling-down bath.

In applying acid and sulphur colors to Chardonnet silk, dye for forty-five minutes at a temperature of 120 degrees F., with an addition of 10 to 15 per cent of Glauber's salt.

The substantive dyes rank next to basic dyestuffs for dyeing artificial silk. For the dark shades the material is entered cold in a soap bath containing either common or Glauber's salt. After rinsing, the water may be squeezed

out with rubber rollers under light pressure. The use of mordant dyes should be avoided as much as possible, because all mordants injure the luster of the silk.

The dyestuff absorbing power of viscose silk practically makes its chemical constitution inoperative. In spite of the absence of nitrogen, it takes basic dyes without a mordant almost as easily as nitrocellulose silk. Substantive cotton dyes are fixed by it so quickly that it is very difficult to get level shades with them, and it is usually advisable to use basic dyes instead. The dyeing of viscose silk is facilitated by adding sulphite of sodium to the dye bath.

It is well known that hydrocellulose is hydrated more easily than the nitrates or acetates of cellulose. Hence viscose silk absorbs dye liquors more greedily. The hydration sometimes occurs with such energy that the fiber nearly dissolves in the water and can be disintegrated with great ease. In this case the cellulose approaches the mucocellulose. Polymerisation or etherification may solidify it and bring it to a state resembling lignocellulose in inertness. Under these conditions the resistance to water can be increased, so that it is convenient either to dehydrate completely the cellulose regenerated from hydrocellulose, such as viscose, and to etherify it—*i. e.*, to acetylate it. Acetylation removes the hydroxyl groups, whereby the affinity for water is lessened. Dehydration by means of alcohol may also be resorted to, to increase the resistance of the fiber to water.

For working artificial silk in the dye bath, bamboo sticks answer very well on account of their smoothness. Care must be taken to keep up the movement so that the silk shall not adhere to the sticks. For dyeing, some prefer copper vats well polished inside. The wetting out of the silk in a half per cent solution of soap, made with soft water, gives more uniform shades than if the water alone is used. When this is done, one or two gallons of ammonia of 20 degrees Be. should be added to every 1,000 gallons of the dye bath to prevent the slight turbidity which the soaps might otherwise cause. For light shades the bath is first made with soft water, 500 to 600 gallons, soap 15 pounds, and ammonia of 20 degrees Be., 1 gallon.

The hanks are entered at a temperature of about 80 degrees F., and worked for a short time to soak them well. They are then lifted, and the dye is added in several portions. Each time dye is added the hanks are re-entered and worked a few times. During this period the bath is gradually heated up to a maximum temperature of 140 degrees F. For very light tints half an hour is enough, and for dark shades an hour may be required. For medium shades the bath for 100 pounds of silk is prepared with soft water, 250 gallons; soap, 10 pounds; and ammonia at 20 degrees Be., 3 pounds. Enter the silk at 75 degrees F., without color solution. Then add the dye gradually and proceed as instructed previously. Towards the end of the dyeing process, if the shade is not yet dark enough, add 5 pounds of phosphate of soda, or 5 pounds Glauber's salt crystals, according to the nature of the dyestuff used. The soda salt favors exhaustion of the bath by promoting the absorption of dye, and so darkens the shade.

For dark shades and black the bath for 100 pounds of silk is prepared with 150 to 200 gallons of soft water, 7½ pounds of soap, and 2 pounds of ammonia at 20 degrees Be. Dye one hour at 40 degrees F., adding the dye in portions as previously instructed, and adding Glauber's salt in crystals when the dyeing is about half over. The amount of crystals is usually 15 pounds for dark colors and 20 pounds for black. In this case the baths do not exhaust and can be kept standing, reinforcing them with three-quarters of the original amount of dye and one-quarter of the original amount of each assistant. After dyeing, rinse in soft cold water, hydro extract, and dry at 90 to 100 degrees F. To preserve the full luster, the hanks must be dried under tension.

(*To Be Continued.*)

BLEACHING TURKISH TOWELS AND KNIT GOODS.

BY WILLIAM B. NANSON, F. C. S.

To the lay mind it would seem as though the present system of bleaching cotton piece goods was an unnecessarily severe one, and to any one familiar with the nature and construction of the cotton fiber and the various matters which are added to it during its manufacture into yarns and cloth, it will be made obvious that its treatment is in excess of all requirements and that many of the processes through which it is put are positively harmful to its structure. In no case is this brought home to us with greater force than in the bleaching of so-called Turkish towels.

The structure of the cotton fiber is of a very complex character, being a collapsed cylinder of almost pure cellulose incased and lined with a waxy resinous covering, and wrapped at intervals spirally by some binding substance. This binder and the resinous varnish or cuticle, composed largely of a supposedly saponifiable fat called cutine—outside and inside the cylinder—are evidently intended to give strength and elasticity to the fiber. Now, in the course of a full bleach, as practiced by the bleachers of today, this waxy cuticle, along with the substance forming the binder, is almost entirely removed, and the sudden liberation of carbon dioxide by the action of the acid in the "souring" process swells out the already weakened cylinder until the pressure bursts the spiral binding substance apart and its support is lost to the fiber; this being removed and the cutine or cuticle dissolved away, there is left only a dead, inert, striated thread of almost pure cellulose, without life, and without elasticity. This is precisely the condition in which we find most of the Turkish towels and knit goods of today. They are stiff, hard and inelastic, with a rough, thin feel, which "scroop" or "scrunch" when squeezed in the hand, and which has a tendency to set one's teeth on edge.

In bleaching cotton goods we have to deal with two factors: the composition and method of removal of the coloring and foreign matters inherent to the cotton fibers themselves, and the matters added during the process of manufacture, such as dirt, oil, size, etc., the former amounting to about five per cent, and the latter to about 10 per cent for the warp only, or a total loss in weight of about 10 to 15 per cent.

With regard to the first of these, their composition has not yet been very accurately ascertained, but it is known that their properties are neutral and that they are composed of carbon and hydrogen with oxygen, and a certain portion of them are made soluble and can be decom-

posed by alkalis and boiling water and by the aid of diastase and can therefore be removed by steeping and boiling. Considerable reliance, in investigating this subject, has been placed upon the use of the microscope, together with micro-chemical reactions, indicating the different behavior of ordinary cellulose and that of its cuticle, owing to the presence in the latter of cutine, which is generally considered as a saponifiable fat, and it may be as well for us to inquire somewhat into the causes and to point out some of the effects of these various reactions before approaching the practical part of our subject, so that our reasons for advocating certain modifications of the present process of bleaching, so far as Turkish towels or knit goods are concerned, may appear more clear to the reader.

Experience has shown us that much of the coloring matter of cotton fiber, outside of the cutine, does not form a part of the fiber itself, but adheres to it mechanically so that it may be acted upon and removed by simple detergents without impairing the strength of the fiber in any way; but, in boiling the cotton itself in an alkaline bath and precipitating the dissolved matter with an acid, it has been found to contain a coloring matter soluble in alcohol, a coloring matter only sparingly soluble in alcohol, a waxy substance termed cotton wax (cutine) margaric acid, pectic acid (pectose) and an albuminous matter.

The principal part of these matters has been found to be pectose, which is insoluble in water, but which can be decomposed into pectin by the action of heat and fermentation. This substance (pectin) is soluble in water, and can therefore be removed by washing.

Now, we wish the reader to bear in mind that in the case of Turkish towels or knit goods, we have only to consider the removal of the coloring matter, and it is therefore indicated that the most obvious and intelligent process and one that would leave the goods in the best possible condition, would be to induce fermentation, and by this means change many of the insoluble matters in the cotton into soluble ones, so that they might be removed by the use of mild detergents and washing.

It has been demonstrated that the cuticle or the pectin composing it is insoluble in the usual solvents of cellulose, but is soluble in strong alkalis. In bleached or mercerized cotton, for instance, and in a great measure in cotton bleached by the lime or caustic process, the cuticle is largely missing or, in other words, the cutine substances have been removed by the treatment with the strong alkali and the strength and elasticity of the fibers much impaired, though the combined strength of the yarn or cloth may show a slightly increased tensile strength, owing to the thickening of the yarn by shrinkage in length.

In the interior of the fibers there are enclosed, besides air, appreciable quantities of a dried matter derived from the protoplasm of the lining cell, and consisting, therefore, almost entirely of albuminoids. And the cell membrane itself is also impregnated with these albuminous substances. When the fiber under the microscope is treated with ammoniacal copper solution, structural variations are easily perceived, and these indications are peculiarly adapted to assist us in following the progress of bleaching processes.

The changes which the fibers undergo when submitted to a half bleach, *viz.*, impregnated with lime and boiled under pressure; washed; soured; boiled under pressure with soda lye at 2 degrees Tw; washed and soured, have been investigated. After each operation, the action of ammoniacal copper solution was noted. It was observed that the cuticle remained for the most part intact after the lime, and even after the soda boil. Some of the fibers, however, swelled up uniformly without the usual constrictions, caused by the binder, showing that the outer layer of the cell substance had been changed by the bleaching operations. The fact that most of these fibers retained their cuticle, showed that the cutine contained therein offered a certain resistance to the action of the reagents employed. Therefore, it is questioned by the writer whether this cutine is a saponifiable fat, as has been stated, for such bodies would hardly withstand two boilings with alkali under pressure. Also very striking is the fact that in most of the fibers, after the lye boil, the albuminoid substances of the protoplasm residues in the albumen were still present and could be easily recognized by utilizing the property possessed by protein substances of storing up coloring matters, and it is to this that we may attribute the fact that while the pectin and other compounds and principles composing the cutine and the albuminoid matter of the fiber may be removed themselves from the fiber, the coloring principles, or the color itself, still remains to be removed by the subsequent chloring process; from this may be indicated the folly of boiling in caustic alkalis goods like Turkish towels or knit goods or other goods intended for white only, as it merely results in the removal of the cutine and other pectic and albuminous substances which we wish to retain to give weight, feel and elasticity to the goods, and does not remove the coloring matters which we wish to bleach out.

Bleachers have claimed, erroneously, that the subsequent yellowing of cotton goods after bleaching is caused by insufficient scouring or "bottoming" in lime and soda, and that the full removal of their waxy and resinous constituents is necessary to insure a permanent white. I would say here that exhaustive experiments have been made as to the exact role which the waxy and resinous constituents of the fibers play in this discolorization, and it has been found that the wax does not aid the discolorization in any way, but as a matter of fact, hinders it.

The result of these experiments show that yellowing is not prevented if the cotton is entirely freed from waxy matters or cutine; on the contrary, it has been proved that some other constituents of the fiber must be the cause of these phenomena, and that the natural waxes and fats in the cotton protect the fiber from yellowing instead of aiding it.

It is safe to say that in all cases where yellowing of the goods occur, which have been bleached by some rapid process without a full and thorough "bottoming," this yellowing has not been caused by insufficient scouring or bottoming, but by the conversion of the cellulose into oxycellulose by the extreme severity of the chlorinating process, and this oxycellulose, as is well known, has a great tendency to promote discoloration.

Hence, the opinion often expressed by bleachers that insufficient "bottoming" is the cause of goods turning yellow is incorrect.

(*To Be Continued.*)

NOTICE.

Will J. M. Jackson, whose former address was 1634 Forest avenue, Knoxville, Tenn., kindly forward his present address to the editorial department?

NOTES ON OILS AND SOAPS.

In the making of soap the alkalis are used almost exclusively in the condition of caustic lye solutions of their respective hydrates in water. Caustic soda is now obtained direct from the soda manufacturer, and one operation—causticizing the soda—is thus spared the soap boiler. Potash lyes may also be bought direct, but in some cases they are sharpened or causticized by the soap boiler himself from the carbonate.

The cotton cleanser always employs an alkaline soap. For the cleaning of printed cottons a neutral olive oil curd soap suits the purpose admirably, for, in this case, free alkali and resin are objectionable. Olive oil soap free from caustic alkali, but often with sodium carbonate, is also used in cleansing silk fibers, although hard soaps free from resin are often employed on acount of their cheapness. For the removal of tarry stains, pearl ash soaps answer well; and for the cleaning of carpets, ox-gall soaps are good to use.

The dyer of cotton and silk materials utilizes soap in pretty large quantities also, though it is very seldom employed in the dyeing of wool. In the dyeing of numerous direct colors it is often used to the amount of 3 to 3½ per cent of cotton dyed. No difficulty arises here in the selection of the soap to be utilized; practically any good, well-made soap will suit the purpose. Soaping after the dyeing process is always resorted to in the dyeing of turkey reds, alizarine reds and para reds on cotton. It exercises a very important influence upon the results obtained, and the process is one which is invariably carried out with a considerable amount of care and discrimination in all large, up-to-date dye works. It has the effect of brightening the colors, for one good point; and in turkey red dyeing in particular nothing is more sought for than a good, bright color. Turkey red goods are largely shipped from Europe to the East, and the brighter the colors the more they are liked by the natives, and the better the sales are. These goods are generally dyed scarlet shade and what is termed "blue" shade; some buyers prefer the one and others the other shade; but in both cases it is always looked for by them that the colors shall be bright; and large quantities of alum, in addition to soap, are regularly made use of in dye works in order to secure these bright color effects which are so much prized.

Soft soaps are made with potash lyes, although in practice a small quantity of soda is used in addition to give the soap greater body. There is no separation of underlyes in potash soap; consequently the product contains the whole constituents of the oils used, as the operation of salting out is quite impracticable owing to the double decomposition which results from the action of salt, producing thereby a hard (principally soda) soap with formation of potassium chloride. Owing to this circumstance, it is impossible to fit or in any way purify soft soap, and all impurities which go into the pan of necessity enter the finished product.

Oils are most extensively employed in every department of the textile trades, and for very important purposes in many cases, and to have a knowledge of the different properties of the various kinds of oils so used is most helpful to all persons engaged in these; indeed, chemists and manufacturers should not content themselves merely with a superficial knowledge of the properties and actions of the various soaps and oils which exist, but should go much more closely into these, for, in many instances, in textile manufacturing operations, they exercise such an important influence for good or bad that, in order to be able to select exactly the soap or the oil which economically will give the most efficient results, it is necessary that the chemist, bleacher, dyer, calico printer and manufacturer should know a good deal about all of them.

In the dyeing and printing of cotton goods, and in their finishing, different oils and mixtures of an oily nature are used for the purpose of insuring various results sought for. When employed with the mordant colors, the oil checks frothing, and fuller and brighter colors are got in addition, and what are termed color oils are also used by calico printers. They are mixtures of a hydrocarbon oil and olive or rape oil chiefly, some being composed of hydrocarbon oils alone. The white petroleum oils are, however, recommended by those who have studied the subject most closely as the best to use in these operations.

Without the use of oil, the dyeing and printing of turkey and alizarine red on cotton, and some of the developed colors on cotton, and the printing generally of various colors with such mordant dyes as alizarine, alizarine cyanine, chrome yellow, etc., could not be got through satisfactorily at all. It is used in these operations in very large quantities, indeed, and by its aid fuller, brighter and faster colors are obtained. Sulphurated castor oil is the oil now employed for this purpose. It is made and sold under a great number of names. At times it is called turkey red or alizarine oil.

In the finishing of cotton prints and cloths there is used a soluble oil which is, in reality, a solution of castor oil soap. Castor oil is different to other oils, inasmuch as its soap will dissolve with ease in water to a clear solution, which may contain as much as 25 per cent of fatty matter and still be liquid. This is utilized in the finishing industry to impart a full, firm, and yet rather pliable handle to cotton cloths; and there are not many, if, indeed, any, substances which will be found to answer the purpose more satisfactorily than castor oil soap.

The first use of soda-ash in soap is attributed to Van Haagen, of Philadelphia, shortly after the civil war, who made close investigations into the properties of the soaps and oils. The procedure employed in the manufacture of genuine mottled soap is the same as for ordinary mottled soap up to the settling change.

Sexton says the fats and oils are organic salts—that is, they are organic acids in which it is replaced by an organic radicle, and the acids vary according to the nature of the fat. Ordinary or hard soaps are sodium stearate mixed with the sodium salts of other acids; the soft soaps are potassium stearate. If some of the soap thus prepared—*i. e.*, by heating fat with soda or potash—be heated with excess of hydrochloric or sulphuric acid, it is decomposed, stearic acid is liberated, and, being insoluble in water, floats to the top of the mixture; if shaken up with ether, the stearic acid will be dissolved. On addition of a solution of a lime salt to a solution of soap, a curdy precipitate of calcium steaate is got, this salt being insoluble. Hence hard waters which contain lime destroy a certain quantity of soap.—*The Indian Textile Journal.*

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all. Suitable letters are paid for in cash.

ARE WE GOING BACK TO FLYER-LEAD FRAMES?

EDITOR COTTON:

In the January issue of COTTON I noticed a statement on page 128, made by "H. C. W.," which, to my mind, is so misleading that I deem it necessary to explain it. The statement follows: "If there is any hesitation of the bobbin, when starting, due to slippage of the cone belt, it simply slackens the end with the bobbin lead. With the flyer lead it would break the end, causing waste and loss of production."

Come, switch off, "H. C. W.," for you are on the wrong track, and if you doubt my statement, kindly answer the following questions:

Do you not raise the bottom cone on both the bobbin-lead and the flyer-lead frames at doffing time to slacken the ends?

When you decrease the speed of the bottom cone on the flyer-lead, do you not increase the speed of the bobbin?

On the flyer-lead, is it not a fact that the faster the bottom cone revolves the more revolutions are taken away from the bobbins?

Any hesitation of the bottom cone has a tendency to slacken the end, and the slippage of the cone belt will cause slackness and not increase the tension, as "H. C. W." would have us believe.

The statement is misleading and should not pass unnoticed. My only object in writing this letter is to help out the growing generation, because I am convinced that we are going back some.

The raising of the cone belt at doffing time to slacken the ends should be proof enough that "H. C. W.'s" statement is misleading, because when the cone is stopped the bobbin speed is increased in the same proportion as that of the flyer. So the only way that it is possible for the ends to break from a tight tension would be for the bottom cone speed to increase. Can anything be plainer?

Let us stop here and think and study how for every single revolution of the sun gear two revolutions are taken from the driving shaft; therefore it follows that the faster the bottom cone revolves, the more revolutions are taken from the bobbins and the more roving is wound on the bobbin. This is what strains and breaks the ends, but the only way this can be done is by shifting the rack a lateral distance towards the starting end of the cones.

I want to say right here that the flyer-lead is bound to come back, and I am going to tell why I believe so. All experienced carders will admit that, with the new, so-called new, differential motion, the cone belt slips more on the starting of the set. The reason for this is that the bottom cone is higher speeded.

Is it not the truth that we are all slowly discovering the fact that the pressure of the paddle in the case of the bobbin-lead is making conditions on all fly frames very unequal? Machine builders themselves admit it. It takes but very little study of the various types of flyers to prove what has been stated. The latest flyer on the market causes so much pressure between the paddle and the surface of the bobbin that the bottom cone, instead of being convex, has straight outlines.

Are we not face to face with a defect which is causing much uneven work in our cotton mills, and one that is responsible to a large extent for poor warping and weaving? There will be a change, and it must be either in the change of the flyers or back to the flyer-lead frame. What have you to say about it, "H. C. W."?

Wash (New York).

[Note.—In accordance with our usual custom, we submitted the criticism by "Wash" to "H. C. W.," and his reply follows.—Editor.]

EDITOR COTTON:

I have read "Wash's" letter in criticism of a statement in my article on "The Roving Process." I have also read "Wash's" other letters in COTTON along this same line during the last year. There is a great deal to be said for and against a great many statements he has made. Personally, I have never worked on a flyer lead frame. Perhaps "Wash" may think that I am, therefore, disqualified from writing on this subject. But let me say that I know of an overseer, who has been in the mill business for 30 years, who had never heard of the flyer lead frame, and yet this man is considered one of the best carders in his section, and if the variation in spinning numbers average more than 3 per cent on 60's, he does not consider his work is running even, and the roving is all made on bobbin lead frames.

I know of a much older man, now retired, who in his day was considered one of the best, who has worked on the flyer lead type. He made a similar statement to me that is worded identically the same as the statement "Wash" criticises. He also told me the flyer lead type was not adopted in this country to the extent it was in England. He also said English manufacturers were fast adopting the bobbin lead type in place of the flyer lead. This statement was made after a trip to England.

Never having worked on the flyer lead type, it was necessary that I should consult some authority for information in regard to it. I quote from the books on "Cotton Spinning" written by William Scott Taggart, who needs no introduction. He states:

"At the present time 'flyer leading' has fallen into disuse. Several reasons are assigned for this: One objection is the increase in speed necessary for the bobbin as it enlarges and gets heavier; another is the fact that through the indirect driving of the bobbin by means of a strap on the cone drums the flyer is caused to start a little earlier than the bobbin, which produces a strain on the roving and results in frequent breakages. This evil is traceable also to the general gearing, and is said to be the result of more

backlash existing in the larger number of wheels used in the driving of the bobbin than in the driving of the flyer. Each may be accredited with its share of the condemnation of this principle, and although the same conditions exist, yet they do not appear as evils when the bobbin leads, for, instead of the late start of the bobbin resulting in a strain and breakage, the roving is slackened a little; this, however, is quickly taken up in the course of a revolution or so as the strap and wheels drop into their working positions."

Richard Marden, who, at the time he wrote his book on Cotton Spinning in 1884, was editor of the *Textile Manufacturer*, an English publication, states in that book:

"It has until recently been generally thought desirable that the bobbin should follow and not lead or run in advance of the flyer. Latterly, however, opinion on this point has undergone a considerable change, and corresponding alterations have taken place. The cause of this is chiefly the fact that the spindles always commence their movement before the bobbin because of their connection with the first motion or driving shaft of the machine being positive by means of gearing, whilst the bobbins are driven through a differential arrangement which includes the cone pulleys and their connecting strap, and which, therefore, do not start so promptly. Owing to this fact, when the flyer leads, a slight stretching of the rove takes place, which injures it. When the bobbin is arranged to lead, this is avoided, as the roving is momentarily slackened, though this is immediately taken up when the different parts have got properly at work."

Since reading "Wash's" criticism I have read a great many books and talked with many men, some who have changed over from flyer lead to bobbin lead in English mills, and one and all say the defect is there and is the cause of the change. H. C. W.

KEEPING THE FLATS CLEAN.

Editor Cotton:

Under the above heading it is nearly always assumed by writers that the flats are more or less filled up, and they tell us how to use this or that wire or bristle brush so regardless of facing up the wire or ruining the foundation of the cloth by setting too deep, and you sometimes have to go pretty deep to get it out. Thus, a race between the brush and the flats goes on, and, more often than otherwise, the wire brush loses out; the flats are filled up again before the brush gets there; anyway, we all have our different ideas on the best way to keep the flats presentable, and I think we all agree on this point: that where such conditions prevail it is a continual source of annoyance. I will, therefore, reverse the usual procedure in articles dealing with this subject by showing how to keep the flats from filling up, providing one can have charge of new cards and not be hampered as to the setting of the flats.

I have yet to see a contrivance that will entirely stop flats from filling up after they have once done so. We must admit that there is a cause for flats filling up, as we find the flats on one card all filled up, while on the next they will be all right. What causes the flats to get in this condition? The one greatest source of this evil is when the card "chatters" through the flats being set too close. For the benefit of those who have never heard the expression or meaning, I may say it is a word used in England, when the wires on the flats and cylinder come in contact and cause the flats to emit a peculiar sound like teeth chattering when a person is cold, only much louder—so loud, in fact, as sometimes to be heard all over a section of cards—and if we are not too far off we can locate it either by the cloud of dust that arises, or, as sometimes happens, the cylinder stopping with the driving belt on the fast pulley.

It will be readily seen that if the flats come in contact with the cylinder at full speed, that will tend to destroy the angle at which the teeth are set, and will bend the teeth back according to the severity of the shock. This makes it more difficult to comb off the flat strips, as can be noticed by bending one or two wires back by hand on the extreme heel of the flat, which is that part of the flat nearest to you when standing behind the card. It will be seen that a few fibers will remain on the flat after it has been combed and brushed during its passage around the card. The same thing happens when a piece of string has gone in with the lap. One can see where it went through the card by noticing the filled-up place on the flats. This is not so bad, as it can generally be fixed by a tool made out of a small portion of a saw-blade; but when it is caused by chattering it is impossible to fix it, as the angle of the teeth themselves has been destroyed.

What, then, should be the right settings for cards, especially new cards, where there is some danger of the cylinder bearings getting hot, which, in expanding, helps to put the wires in closer contact with flats. I have known such heating to cause a card to become all faced up where the settings were too close. The flats on new cards should never be set closer than nine thousandths, except the last two setting points, where it would be all right to use the .008 gage. In some instances, where cards are placed in the basement, with the foundations solid, it is possible to set a little closer, but the settings given are close enough if we want to keep the wire in the best of condition.

Then there is the "feel" to consider in setting flats. Anyone can push a gage across the surface of the wire, but it requires a little intelligence to set them right. I had to set the flats for one superintendent at .007 and .006 on top of the bend and he showed me exactly what he thought was the "feel" for this setting. I set the flats and then called him over before I started the card up, according to instructions. He was perfectly satisfied after he went over it, but just at that moment the card-fitter stepped up and wanted to try the gage. After doing so he said it was nearer .004 than .006; so you see there was quite a difference on that point between the two men. I knew the fitter was right, but I was working for the other man, who was, by the way, supposed to be an expert. I asked the overseer how it was that the **"super" insisted on having** the flats set too close, and he said, "Well, I worked for him in a mill where we had American cards with wood tops and we always set them to a 7 gage and these ought to stand a little closer setting." To prove his statement he pulled out a pocket-book and he handed it to me. The first thing I saw was—"Flats to Cylinder 11 gage." I had the laugh on him, and the funny part of it was he could not read or write; just imagine an overseer with no education.

To get back to the subject, the right "feel" is one that is what I should call "sticky;" neither harsh nor easy to the feel when setting. If the settings are quite a little

off, always go over them twice, as, if you pull down the flats at the second setting point, after fixing them right at the first, the flats at the first setting point will be too close. When grinding the flats always use the same ear for both sides of roller, or in time the wire may be worn more on one side than on the other owing to the fact that some people have better hearing with one ear than the other. Do not grind too heavy, and after grinding use a burnisher, not to clean the flats, as so many grinders seem to think, but to take off, or smooth up the rough edges on the sides or top of the teeth, caused by grinding, so there is no necessity whatever to set the burnisher in the flats any deeper than 1-16 of an inch. Of course there are other causes that help to fill the flats, such as impurities going in the feed roll, which lift up the roll and let a portion of the lap get down in the licker-in and thrown around the cylinder, also the web going around the doffer, but the main reason for the flats getting filled up are the ones I have described.

Lance. (Michigan)

QUICK AND SLOW CARDING.

Editor Cotton:

I remember some time ago one of your readers was asking for information regarding revolving flat cards, and among other questions he asked which was preferable, quick or slow carding. Someone who answered the question, or undertook to do so, came out with a statement that there was no such thing as quick or slow carding, and that he presumed that your correspondent meant light or heavy carding. I wish to disagree with him on that point. I have been working in the cotton mills of the South for the last twelve years, and believe that during that time I have become very familiar with the terms used by the Southern mill man, and if I was to hear an overseer of carding say he was doing heavy carding, I would understand at once that he was putting in a heavy lap and taking out a heavy sliver, but I would not know if he was carding fast or slow.

By fast or slow carding I understand the term to mean this: If I feed a lap in at back weighing, say, 15 ounces per yard, at the rate of, say, 25 yards per hour, and am getting a sliver that weighs 65 grains, I would be doing heavy carding and also very quick carding. If I was to increase the feed to 30 yards per hour, not changing the draft, I would, beyond doubt, be carding quick, because the cylinder would be making the same number of revolutions in each case, and it is the cylinder that does the carding. But if, on the other hand, I was to reduce the feed to 15 yards per hour, the draft remaining the same, I would be carding slow, as the cylinder speed remains the same, whether the doffer speed is fast or slow.

It should be readily seen from this that a slow doffer speed means slow carding, and a fast doffer speed means quick carding, regardless of whether the lap is light or heavy, and also regardless of the weight of sliver as a nine-ounce lap, if fed in at the rate of 25 yards per hour, is carded quicker than one which is fed in at the rate of 15 yards per hour, regardless of weight of sliver or draft. In the first case you have quick and light carding, and in the second case slow and light carding.

As to the merits of quick or slow carding, if you have good, clean stock, the quicker you can get the stock through the card the better the resulting yarn, as the fibers are not weakened by the action of the carding surface. A light sliver and quick doffer speed are always preferable to a slow doffer speed, although in many cases, owing to the pickers not being set to do their share of the cleaning, it is sometimes necessary to do slow, heavy carding, but such practice always weakens the yarn, due to the extra strain put upon the fibers by being acted upon by the carding surfaces a much longer time by the card than in quick carding.

Hoping that I have made myself clear on this subject, I will leave the question open for any others who may desire to take the time to study the question. I believe the card is the least understood and most abused machine in the mill. Still it is here that the foundation of good or bad work is laid. H. O. W. (North Carolina).

THAT HUMAN NATURE DEPARTMENT.

Editor Cotton:

I have read with considerable interest your editorial and the contributions in the various issues of Cotton on the question: "Should Textile Schools Have a Human Nature Department?" Possibly your readers would like to have the views of a member of the class most concerned, the textile student.

For six years I have been acquiring experience in the mill business, right in the mill, and at hard work, and now am taking a course in a textile school. If the science of the management of help (and it certainly is a science), could be taught in a school, then textile schools should certainly be equipped to teach it, for the proper management of help—the ability to get from help the maximum of effort with the minimum of friction—is one of the most difficult of the mill man's problems.

The ability to manage help requires primarily tact and personal magnetism, which cannot be taught in a school or even acquired by experience, but is a trait of character with which some men (and the number is comparatively few) are naturally endowed. However, there are two factors, which, added to this natural trait of character, make a man a better leader of men, namely, a broad education (in its truest sense a training and broadening of the mind), and years of practical experience in the work, and personal contact with the people over whom he is to have control. This will give a better conception of the view-point of the employe, and tend to a better understanding of each other.

This, it seems, is the great draw back to the textile schools of today, they are unable to furnish this personal contact with the mill people and to bring the student into touch with working conditions which he will have to meet when he takes a responsible position in the mill.

So, sifting the matter to rock bottom, it all depends on the man himself; the view he takes of his school course and of the work itself; and how he connects the two, and also upon his willingness, the first two or three years after leaving school to take a post-graduate course in the hard school of practical experience. The reason for the failure of so many textile graduates seems to be in their unwillingness to make the sacrifices which are absolutely essential if they are to make successful mill men. They must realize that as the school is unable to give them the personal con-

tact with the mill people and the insight into working conditions in the mill, that they must get that for themselves, and get it in overalls in the mill.

Too many enter a textile school, and even graduate, with the idea that the school is turning them out equipped to take a superintendent's job, at not less than $1,200 per year, while if they had very little practical experience in the mill, they have not much more than laid the foundation upon which to build their textile education. Why should this fact be allowed to keep so many young men out of a line of work which offers such bright prospects as does the textile industry? Do we not find the same state of affairs in other trades and professions? No graduate of any law, theological or technological school is prepared to enter upon his profession or trade and command the respect or receive the remuneration which the successful professional man or skilled mechanic receives until he has put in years of hard work and study at his vocation.

Not that I would be-little the work of the textile schools. Far from it! They are doing a good work and are filling a much felt need; but they have this handicap to meet, and until they overcome it they can never expect to turn out the all-round, efficient mill man, and overcome the prejudice of the practical, though uneducated man who thinks because he has risen to a position of responsibility without the advantages of school, that that is the only way it can be done.

There should be some way by which the periods of study and practice work in the school could be interspersed with periods of work in the mill, and above all the student should be encouraged to mingle with the mill help and learn to look upon the industry from the view-point of the operative as well as that of the employer. But, the accomplishment of this is necessarily left to wiser and more experienced minds. Every textile school should have at its head a thoroughly practical mill man who understands the details of textile manufacturing and who knows the working people through intimate contact which has taught him to consider their view-point. Such a man should be able to do much towards equipping the textile student f r his life's work. But, let me repeat, and with special emphasis, it all depends on the *individual student and his attitude.*

R. F. P. (North Carolina).

WHY WARP BREAKS AT THE LOOM.

Editor Cotton:

What causes the warp yarn to break at the loom? Such breakage has been carefully watched, and, in most cases, found to result largely from knots and bunches and other causes rather than from weakness. Many tests have been made from time to time by mill men, and it has been found that even when warp yarn is breaking at standard weight and free from knots and bunches, it can be weakened to a large extent in the methods of operation.

In most all cotton mills, the breakage of the warp yarn at the looms is laid to the treasurer of the mill for buying poor stock, or to the carder and the spinner. We hear very little about the boss slasher, but this is the very place where the yarn is weakened during operation, and millions of yards of warp yarn are being spoiled in our cotton mills at this writing.

There is no doubt that many readers of Cotton have experienced the following: All the overseers are summoned to the cloth room to look over the cloth, which is found to have threads out here and there and of considerable length too. What is generally done in such cases? The thought of sizing the warp yarn steals over every man present, but when the yarn is sized and found to be breaking above the standard, this is the problem which I wish to convey to the readers of Cotton. I have been in hot water more than once, and in most cases found the cause to be as follows:

Loss of elasticity is the chief cause of the warp yarn breaking at the loom, and this continues to prevail because there is not the right amount of stretch on the yarn between the size rolls and drag roll. It is admitted by all up-to-date mill men that if the warp yarn is stretched when wet it loses its elasticity, a feature all warp yarn should retain, because this yarn is largely governed by the usefulness of its application, and by its liability to break in the loom.

A good slasher tender is to a weave room, what a good grinder is to a card room, because any neglect on the part of the grinder can be felt for weeks afterwards, and the same can be applied to the slasher tender. All slasher tenders should watch the percentage of stretch between the size rolls and drag roll. There should always be a slight and continuous amount of stretching, but not too much. When too little or no stretching exists on the yarn between the size rolls and drag roll, the yarn does not hug the cylinder as it should, and a portion of the yarn is not dried properly at the slasher, but dries on the loom beam instead, and then the ends are matted together to such an extent that when the matted portion comes under action of the lease rod, many ends will break.

Now boys, is not what I have pointed out a common occurrence in many cotton mills?

If too much stretch exists between the size rolls and drag roll, the yarn is stretched when wet, and loses much of its elasticity. As the warp threads are pulled out of line by the harnesses lifting and lowering, a certain amount of strain comes on almost all the warp ends at each lift of the harnesses, and if the warp ends have no elasticity, or the vibrator is not set to follow the movement of the harnesses, the ends are continually breaking, but with more of a snap than in the first case. For this reason, the side shaft was adopted to drive the different parts, so that the size rolls will deliver the same amount of yarn as that taken up by the drag roll.

It was formerly a custom to have the yarn turn the cylinder, but it was soon discovered that in doing so the elasticity in the warp yarn was almost lost.

When a slasher tender changes the size roll cloth, he is, as a rule, careful, and puts all his knowledge and skill on the job, because he understands and knows that if this roll is not properly covered too much starch will follow the yarn, and in a short time there will be trouble. But with the drag roll it is different. Very few slasher tenders seem to give the covering of this roll due consideration, and they will cover it with a layer or two of cloth without taking the thickness of the cloth into consideration. Consequently, stretching between the size rolls and drag roll takes place, with the result of much warp yarn breaking in the loom caused by its loss in elasticity.

The slasher tenders being careless in covering the drag roll, is because the evil caused by such carelessness falls on the weaver. One good rule which will minimize this trouble is to always have the drag roll three-sixteenths of an inch larger in diameter than the size rolls.

Wash, (Mass.)

WHICH PRODUCES MORE WASTE, A FINE OR A COARSE MILL?

EDITOR COTTON:

Some time ago a bunch of overseers were discussing a recent newspaper article, when the question suddenly arose, which will produce more waste, based on percentage of product, a fine or coarse goods mill? I had never heard the question asked before, but I stated at once that the fine goods mill would produce the largest percentage. No one seemed to agree with me, and quite an argument ensued. I stood my ground more in a spirit of friendly combat than otherwise, for I had never thought at all on the subject before and could scarcely do more at the time than keep up a cross fire with my antagonists. Since then I have considered the subject carefully, and while I have not changed my mind, yet I would like to know what some other mill men think on the subject.

I shall detail here some of my reasons why I think a fine goods mill will produce the largest per cent of waste and will thank any informed mill man to correct me if I am in the wrong.

A fine mill cannot re-run much if any of its flyings, strippings and white waste successfully. If it does, it must run such stock into heavier and coarser goods and to that extent becomes a coarse goods mill. It is true that to do this may be the best policy, but it does not alter my contention that when a mill does so, it ceases, to that extent, to be a fine goods mill. If a mill equipped to run and running say 60's to 90's yarn and goods made from such yarn, runs part of its plant on 18's to 20's or even lower counts in order to use the waste, then the part so run cannot legitimately be said to be a fine goods mill. Hence my contention that a strictly high count, or fine goods mill must produce a larger percentage of waste because it cannot re-run anything like as much of its own waste into its regular produce.

I also contend that because of the higher counts, more processes are usually required, and as each process may be expected to produce some waste, therefore, the fine goods mill will produce a greater percentage. Furthermore, in a fine mill either double carding or combers are used, some times both. Usually an extra process on the fly frames. These mean more waste. In the spinning room, many fine mills size the yarn before weaving or otherwise disposing of it in warp preparation. A number of extra processes such as baling, beaming, quilling, rewinding, warping, etc., some or all of them are used, and all which are used may be expected to produce waste.

In weaving, most fine goods go into fancy weaves and require more handling and more complicated machines, all of which may be reasonably expected to produce some waste and often in big bunches. Where warps are run on double beams, the two beams rarely if ever run out together, hence more waste. Complicated machinery is constantly smashing, causing waste. Errors in calculations and judgment often creep in and also cause waste. These things would not be so apt to occur in a coarse mill, and if they did they would not be nearly so significant, be more easily remedied and cause less waste.

I contend further that because of the higher grade of product, extra care in finishing, close grading, etc., that the fine goods mill may be reasonably expected to produce the larger percentage of waste. In finishing, most fine goods mills are today doing more or less of their finishing locally. Every finishing process makes waste and sometimes in big bunches. Who has not seen many yards of finished goods ruined on the tenters, calenders, drying-cans, nappers, or on some other process in finishing by some one of the thousand possible ways that are too numerous to mention here, and also might include the dyeing, bleaching, etc., or any other finishing processes employed by the mill before finally shipping their product, and in the cloth room and packing much more jealous care must be exercised, many imperfections that would pass into the regular product of coarse mills, must, in the finer mills, be cut out and go into rags. These imperfections are also vastly multiplied because of the greater difficulty in weaving higher counts and fancier goods. For example take one item, the clipping of seams. In a coarse mill the seams are usually torn apart without waste and the cut marks are ignored and allowed to go into the piece wherever they chance to come, but in the finer mill, all seams must be carefully cut out, also all cut marks, so that the customer gets a clean, smooth end to each piece of goods he buys. This makes much excess waste, as any finishing room overseer will inform you.

Then another item not to be overlooked is that of moisture. The texture of fine goods is finer, the goods lighter, yarn smaller in diameter and hence will absorb and carry through to finished product a much less percentage of moisture than will the coarser goods. This holds true also in slasher size. It is borne out by the fact that most modern mill men at present figure a much smaller percentage of size when calculating to produce a finer cloth than they do for a coarser one.

I am conversant with many of the ideas the opposition will advance and also can divine some of the exceptions that may be taken to some of my premises, but I am anxious to hear from them just the same, and allow me to say I am not prejudiced but open to conviction.

Toothless Tom. (Miss.)

TRADE DIRECTORY OF SOUTH AMERICA.

A complete revision and detailed classification of the names of South American importers and merchants, made by the American consular officers in cooperation with the Bureau of Foreign and Domestic Commerce, has been published as a section of a new edition of the World Trade Directory. The lists have been brought up to date and are presented in uniform style, with a finding index.

A new feature is the listing, so far as the information could be obtained, of (1) the American and other foreign agents of South American importing firms, and (2) of the names of the parent firms of branch houses located in various South American cities.

The Directory does not aim to include the names of South American exporters, nor are the names of manufacturers given, except those who are, or seem likely to become, purchasers of American materials or merchandise. The publication is a Directory of South American buyers for use by exporters and manufacturers in the United State.

The Directory is in octavo form, bound in buckram, and is sold at $1.00 a copy, to cover partially the cost of printing. Those desiring one or more copies of this Directory should apply to the Bureau of Foreign and Domestic Commerce for the necessary order blank.

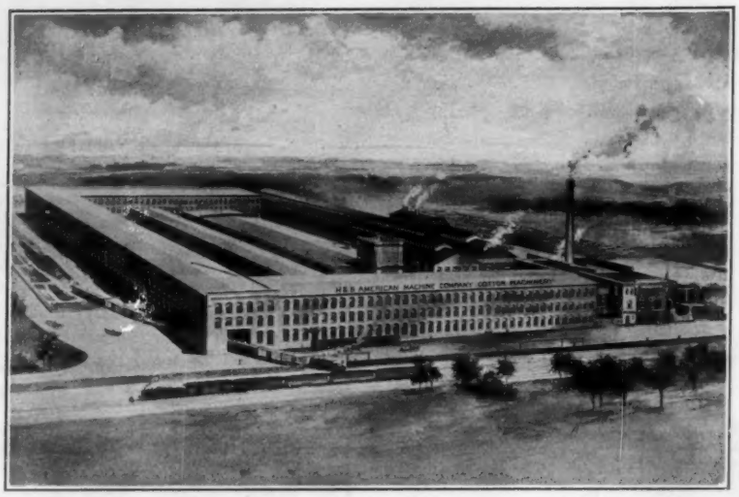
C. E. RILEY, Pres.
Boston Office
65 Franklin Street

Southern Offices
814-815 Empire Bldg.,
Atlanta, Ga.

COTTON MACHINERY

Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

New Machinery and Trade Notes.

AN ATTRACTIVE SOUVENIR.

One of the most artistic and attractively arranged albums of photographic views we have seen in a long time has just been engraved and printed by a Philadelphia firm for the Dillard Jacobs Agency, of Atlanta. This work, which is 10¼ by 14 inches, illustrates the properties of the Clinchfield Fuel Company, of Spartanburg, S. C., and the Clinchfield Coal Corporation, at Dante, Va.

The cover is of heavy, dark green stock, illuminated in three colors, and bound with olive green silk cord. The inner pages, which contain many full-page reproductions in three colors of photographs taken in and around the Clinchfield mines, are intended to give the reader an idea of the various processes involved in the mining and transportation of coal. These are printed on heavy plate paper, and include views of Dante, Va.,, which is a typical Clinchfield operation, flashlight scenes from the mine interior, and many views of the loading and transportation facilities.

The album also contains three panoramic views in full colors. Two of these are 10 by 38 inches in size. One shows a panoramic view of a part of the Clinchfield properties. Another depicts a Clinchfield coal train over a mile in length.

This handsome album is being distributed among the principal users of steam coal in the special territory reached by the Clinchfield Fuel Company.

NEW DATA BOOK ON SILENT CHAIN DRIVES.

An engineering data book has just been published which will enable users of power to select the correct silent chain drives for their work and determine exact costs from list prices shown in the book.

Besides giving complete engineering information on silent chain driving in simple and compact form, this "Data Book No. 125" describes many uses of silent chain for the efficient transmission of power, and gives specific reasons and illustrations showing its application in a large variety of uses.

Link-Belt silent chain is a series of links connected by joints which consist of segmental case-hardened bushings and case-hardened steel pins. This chain is claimed to be as flexible as a leather belt and as positive as a gear. Its efficiency is given as 98.2 per cent on actual test. It will transmit any amount of power quietly. Over 200,000 installations, we understand, were drawn upon for the information contained in this data book.

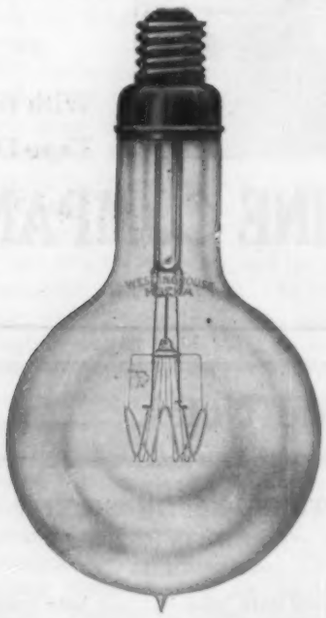
The book is the only work of its kind, and consists of 112 pages, bound in a flexible red cover. Copies may be obtained free of charge by addressing the manufacturers, the Link-Belt Company, Thirty-ninth street and Stewart avenue, Chicago.

A NEW IMPROVED MAZDA INCANDESCENT LAMP.

For a long time there has been a demand for an incandescent lamp of high candle power. Those who wanted the simplicity and reliability of the incandescent system have in many cases refrained from using it because of its relatively low efficiency when compared with large units of other systems.

The WESTINGHOUSE LAMP COMPANY has just put on the market an improved Mazda Lamp which will meet this demand and fulfill all its requirements. This lamp operates at an efficiency of approximately .6 watt per candle power, which is 33 per cent higher than any efficiency ever before obtained in a commercial incandescent lamp for standard lighting circuits.

The filament in the lamp consists of a closely coiled tungsten wire, suported by anchors, as shown in the illustration. The lamps are made in 750 and 1,000 watt sizes



for 100 to 130 volt circuits, the 750 watt giving approximately 1,100 candle power and the 1,000 watt approximately 1,550 candle power.

The color of the light given by these new Westinghouse Mazdas is superior to that given by any other form of incandescent lamp. It approaches sunlight more closely than the regular Mazda lamp.

The lamps can be operated on direct or alternating current circuits of any frequency in commercial use today.

On account of the intense brilliancy of the filament, it is desirable that the lamps be used with some kind of diffusing reflector, and they are ideal lamps for indirect or semi-direct lighting.

It is stated that trial installations of these improved Westinghouse Mazda lamps have proved conclusively that the lamps are perfectly reliable, and that satisfactory life and service can be guaranteed.

It is expected and believed that these lamps will be used extensively in textile mills for illuminating large areas because of their special adaptability for this service. The fact that they reduce the cost of light 33 per cent is something which recommends them strongly.

While cotton mill managers are frequently given to delaying the making of changes in their lighting equipment until the late summer, it would be a wise business move to investigate and try out these new lamps at once. The cost of equipping one department would be moderate, after which a fair comparison could be made between the old and the new systems.

The WESTINGHOUSE LAMP COMPANY has issued a bulletin giving full information in regard to the new units, copies of which can be obtained by writing this company at 1261 Broadway, New York City.

A PAINT WITH A PURPOSE.

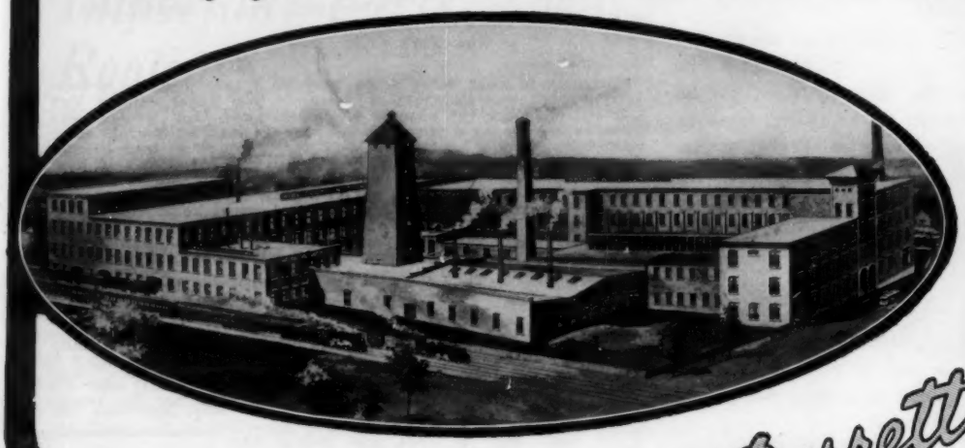
One of the first requirements in cotton manufacturing is well diffused light. All the mill buildings constructed within recent years have had this point stressed strongly and large areas of wall surface devoted to window space. When it became apparent to the managers of older mills that those of later construction had an advantage over them because of better lighting facilities, they immediately began to look around for something which would add to the efficiency of their own mills. Not being prepared to reconstruct their mill buildings, the next best proposition was to coat the interior surfaces of those buildings with some light reflecting paint which would help to diffuse the rays of sunlight during the daylight hours and assist the artificial illuminants at other times.

In order to fill the requirements desired by these mill managers the paint must of necessity be permanent first and foremost. It should have a hard, flinty surface which will retain its pure whiteness indefinitely. It should be of such construction that it could be repeatedly washed and scrubbed from time to time. It should also be absolutely sanitary. It should not scale off, and furthermore it should be made in such a manner as to be easily applicable with a brush and have good surface covering qualities.

It is claimed that such a paint has been found in Chaffee's Mill White, manufactured by the THOMAS K. CHAFFEE COMPANY, of Providence, R. I. The makers of this paint not only claim the good points outlined for paint for mill white purposes, but they also manufacture this paint in three different finishes to best suit the conditions under which it is to be used. This paint may also be tinted to any desired shade. While this paint works miracles for managers of the old style mill, the executive heads of the new and well lighted mills have also found that a thorough coating of white on their walls and ceilings reflected the light better and made their employees more efficient. The experts of this company stand ready to render assistance in solving the paint problem of any prospective user. A postal card will do the business.

The March, 1914, issue of *Graphite*, the monthly house organ published by the JOSEPH DIXON CRUCIBLE CO., of Jersey City, N. J., contains on its back cover page some interesting photographs of smokestacks painted with Dixon's Silica-Graphite Paint. An interesting feature of this series of pictures is that of ten photographs shown, seven of these smokestacks are located in the South. That the Southern field is a broad one, and that business conditions are exceptionally good, is thoroughly realized by the Joseph Dixon Company, who are going after the business and going after it hard.

Why *you* should be interested in Roofing



Wright Wire Company,
Worcester, Mass.,
Buildings
covered with
Barrett Specification Roofs.

Barrett Specification Roofs

FREQUENTLY the building of a roof on a factory or warehouse, or any building, is regarded as merely incidental to the whole proposition.

Great care and thought are spent in deciding whether to use stone or concrete for the foundation. Even the choice of materials for the fence about the place gets its share of attention.

But with many owners of buildings the roof is only a roof and they take it as a matter of course that they must repair leaks every now and then. Do you realize that this is the wrong viewpoint?

The roof is a most important part of the structure. If properly specified, you will be free from leaks and trouble and expense.

The Barrett Specification is the scientific standardization of an old established theory of roofing—one that has stood for years as the best in roofs—namely, a combination of coal tar pitch, tarred felt and gravel or slag.

If *you* want a really waterproof, fire-retardant roof covering that will last 20 years or more, be sure you get a Barrett Specification Roof.

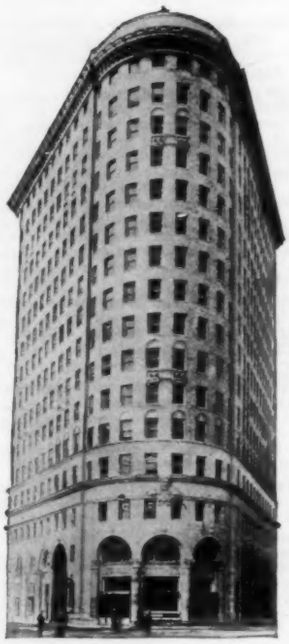
Special Note

We advise incorporating in plans the full wording of The Barrett Specification, in order to avoid any misunderstanding.

If any abbreviated form is desired, however, the following is suggested:

ROOFING—Shall be a Barrett Specification Roof laid as directed in printed Specification, revised August 15, 1911, using the materials specified and subject to the inspection requirement.

The Turks Head Building
Providence, R. I.
Architects, Howells & Stokes
Builders, Thompson-Starrett Co., New York.
Barrett Specification Roof



A copy of the Barrett Specification in full sent free on request. Every owner, builder and engineer should have it.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City
Cleveland Cincinnati Minneapolis Pittsburgh Seattle Birmingham
THE PATERSON MFG. CO., Limited: Montreal Toronto Winnipeg
Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

TRADE B MARK

THIRTIETH ANNIVERSARY OF THE P & B TRADE MARK.

Thirty years may not seem like a period of remarkable duration, while on the contrary it may loom up almost like an eternity. It all depends on the point of view, but no matter from what angle it is looked at, admission must be made that during the last thirty years wonderful strides have been taken, leading to the goal of perfection, in the manufacture of things generally. Probably in no other similar period of the world's history has the general advance been so marked, says *The Exchange*, a journal issued by the Standard Paint Co.

Thirty years ago electricity was only really beginning to show its possibilities. Thirty years ago electrical men were severely handicapped by the lack of an efficient insulating material, and they were loudly clamoring for one in which they could place their confidence.

Then—at the psychological moment—the P & B paints and compounds entered and were received with great acclaim. Despite the wonderful commercial and manufacturing advancement referred to in the opening paragraph, P & B trade mark materials have held their own, and this, regardless of the fact that the component parts are almost identical today with what they were at the time this material made its first bow to electrical engineers.

In *The Exchange* of June, 1911, a letter written by J. W. Marsh, president of the Standard Underground Cable Company, was published. This letter cites a case unparalleled by any insulation since the days of Benjamin Franklin. It refers to a cable in Philadelphia, which was torn up after more than twenty-four years underground, where, amongst city pipes it was subject to the most contaminating acids and gases imaginable, but still after all those years underground, Mr. Marsh wrote, "it shows absolutely no indication of deterioration in any way."

Now that the thirtieth anniversary of the P & B trade mark is being celebrated, it seems a fitting time to again call attention to this letter, which follows:

Pittsburgh, Pa., May 1, 1911.

Mr. Ralph L. Shainwald, President,
The Standard Paint Co., New York.

Dear Sir:—

With reference to an article that appeared in the issue of February 11, 1911, in the Electric Review and Western Electrician, published at Chicago, and in which the following statement was made:

"A cable was removed from the ducts of the city of Philadelphia, September 22, 1910, due to a change in the arrangement of circuits necessitating the withdrawal of this particular cable. This cable was installed in Broad street, Philadelphia, running from Chestnut and Broad streets south to Washington and Broad streets, during the month of May, 1886, having been manufactured in April, 1886, by the Standard Underground Cable Co. It had, therefore, been in operation continuously for over twenty-four years, and even at the present time shows absolutely no indication of deterioration in any way, notwithstanding the fact that while the cable was sold to operate under a working pressure of 600 volts, the circuit had for years been used for 2,000 volts arc-light service.

"The make-up of the cable is of some interest, due to the fact that the insulation is of a saturated fiber, a type that, due to the increasing demands for higher voltage, has been largely superseded. The cable in question is a No. 4 B. & S. gauge stranded conductor, made up of sixteen No. 16 B. & S. gauge wires."

We beg to say that, at your request, we have looked up our records and find that in connection with the manufacture and installation of the cable in question, the specifications call for a braid of cotton yarn over the lead and its saturation with your No. 2 P & B Paint, to protect the lead cover against chemical action, your paint having been used in this case.

We have secured a very small sample of the cable and are keeping it in our office here. It shows the braid which was so saturated to be in splendid condition.

We naturally regard this very remarkable history as a great recommendation for our cable, and as also proving the value of your long established P & B Paint for the purpose.

We have no objections to having you refer to us any parties that may want further information in this matter. Yours truly,

Standard Underground Cable Co.,
J. W. Marsh, President.

In reply to a recent letter Mr. Marsh confirms his first letter as follows:

Pittsburgh, Pa., January 12, 1914.

The Standard Paint Company,
New York City.

Gentlemen:—

In reply to your letter of January 10, I take pleasure in confirming what was stated in my letter to you under date of May 1, 1911, regarding the absence of deterioration in a cable of our manufacture having a fibrous braid over the lead, such braid saturated with "P & B" compound, and which cable had been in continuous use upwards of 24 years when it was withdrawn in September, 1910, on account of rearrangement of circuits.

I am pleased to say also that we have continued to use your "P & B" compound in our business and with the most satisfactory results.

I congratulate you on having reached the thirtieth anniversary of "P & B" trade-mark, and with best wishes for a continuation of your well-deserved success, I remain,

Very truly yours,
J. W. Marsh, President.
Standard Underground Cable Co.,

Users of the Standard Paint Company's products, many of whom are familiar with nothing but "Ru-ber-oid" and "Ka-lor-oid" roofing, would do well to consider the possibilities which P & B paints and compounds are continually opening to them.

SOME INTERESTING STATISTICS.

The January number of *Cotton Chats*, published monthly by the Draper Company, Hopedale, Mass., contained a list of 259,896 Northrop looms and their location throughout the country. This included orders to January 1st, 1914.

It is particularly interesting to subdivide these loom figures and note the sectional location. 139,663 are located in the Southern states, and 120,233 in the New England, Middle and Western states.

South Carolina alone has 75,062 of these looms, or more than 28 per cent of the entire number. Massachusetts comes second in line with 47,920. The third and fourth positions are captured by Georgia, with 21,664, and North Carolina, with 21,447.

During the past five years the Draper Company give their Northrup loom shipments as follows: 1909—22,389; 1910—22,855; 1911—21,015; 1912—20,814; and 1913—19,010. Of the 19,010 looms shipped in 1913, about two-thirds replaced old common looms. That time is proving the value of looms of this class over plain looms is evidenced by the further fact that Northrup looms on order on January 1st, 1914 totaled 12,656.

A softening and sizing oil highly spoken of in the trade is the Soluble Softening Oil made by The Arabol Mfg. Co., 100 William street, New York City. As a softener it far surpasses tallow. It is always uniform and reliable, and not influenced by temperature. It is easy to handle, lets the threads divide well in the lease rods, and the cylinders of the slasher remain perfectly clean, while it gives a smooth finish to the wares. It is the very thing wanted for strong and close-woven goods.

The February, 1914, issue of *Yarns*, a magazine devoted to more rope, and published by the American Mfg. Co., of Brooklyn, N. Y., and the St. Louis Cordage Mills, of St. Louis, Mo., has been received. It contains its usual interesting assortment of photographs of power plants and other service using American transmission rope, and also contains an interesting letter from Charles F. Brown, of the American Mfg. Co., who is now traveling in India, entitled "India—A Land of Hustle."

Important Facts About Roofing

RU-BER-OID is the original flexible, smooth surfaced, prepared roofing. Its introduction, in 1892, followed some five years of experimentation, in which The Standard Paint Company employed the services of skilled chemists in America and abroad. This opened a new era, and for the first time a ready-to-lay roofing was offered, which was free from the disadvantages of tar roofings, and which would not run under the most severe heat or crack with extreme cold. Its serviceability is vouched for by the fact that the first RU-BER-OID roofs applied in 1892 are still in good condition, still serviceable and weather-proof.

RU-BER-OID
PRONOUNCED
"RU" AS IN RUBY
ALWAYS SPELLED WITH
ONE B.

KA-LOR-OID (Colored Ruberoid) came later, and possesses all the enduring characteristics of RU-BER-OID with the added feature of having attractive and permanent colors worked into it in the course of manufacture.

RU-BER-OID and KA-LOR-OID (Colored Ruberoid) contain no rubber or tar. They are not "asphalt" roofings. They are tasteless and odorless, and may be used on roofs from which drinking water is gathered.

They are effective insulators, for they exclude both heat and cold. They are fire-resisting. Hot coals thrown on them do not set fire to the roofing or to the sheathing beneath.

Roofings of Metal, Slate, Tile, etc., have no advantage over RU-BER-OID and KA-LOR-OID in insurance rating. All are placed in the same class by fire underwriters.

THERE IS
NO RUBBER
IN THE COMPOSITION
OR PRONUNCIATION OF
RU-BER-OID

Both RU-BER-OID and KA-LOR-OID consist of a felted fabric which is saturated and coated with flexible RU-BER-OID Gum.

There is no secret about the foundation of this fabric. It is the best roofing felt procurable. The only secret lies in the process of making RU-BER-OID Gum. This Gum is waterproof and as flexible as new rubber. Yet, unlike rubber, it retains these qualities when exposed to the elements. Rubber rots after slight exposure. RU-BER-OID and KA-LOR-OID retain their life and flexibility under the severest weather conditions.

RU-BER-OID and KA-LOR-OID (Colored Ruberoid) are inexpensive to buy, cost little to lay and require very little attention. They are in the end the cheapest roofings known.

Booklet containing a lot of roofing information and interesting comparisons of various classes of roofings will be mailed upon request.

The Standard Paint Company,

100 William Street, New York.

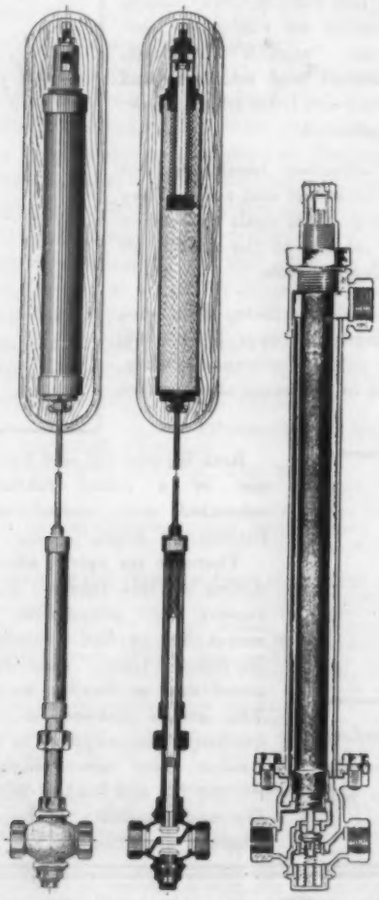
For Leaky Cellars & Pits
IMPERVITE
is GUARANTEED to Waterproof

A TEMPERATURE REGULATOR.

The question of even, stable temperatures is an important one in the mill or finishing plant, and it usually devolves on some reliable man to watch the thermometer and adjust the heat units. As no human being is infallible, however, a mechanical regulator which is prompt and positive in its action is much more dependable than even the best man obtainable.

The Sarco temperature regulator is based on the same thermostatic principle as the well known Sarco steam trap, using as its actuating motive power the expansion of a sensitive liquid hermetically sealed within a chamber into which is inserted a flexible corrugated tube. It is substantially made and is not liable to get out of order. It is compact, simple, and wholly self-contained, requiring no exterior operating means such as compressed air, water or electricity. It also avoids the use of rubber, leather, or metal disc diaphragms.

The room temperature regulator which is shown in the illustration has the thermostatic element mounted on a board for exposure in the atmosphere, the temperature of which it is desired to control. It is specially adapted for regu-



On the Left the Sarco Room Temperature Regulator. On the Right a Sarco Mixing Valve.

lating the temperature of office buildings, living apartments, public institutions, car heating, drying rooms, gas mixing rooms, varnish and paint rooms, paste rooms, in fact is applicable in hundreds of places where the temperature of the atmosphere must be uniform. It gives a medium of control that is practically perfect, and it is claimed, will absolutely prevent underheating or overheating. Apart from its operating fluid, it is composed entirely of metal, is frictionless, positive and invariable in its action.

This regulator is very substantially constructed and a slight increase in the temperature of the surrounding atmosphere expands the operating fluid, producing a powerful hydraulic pressure, tending to close the valve, while a decrease in the surrounding temperature produces immediately a responsive contraction of the fluid and gradual opening of the valve. Thus the action of the regulator is a positive one, and so reliable as to make it suitable for even the most delicate manufacturing processes as well as for ordinary room temperature regulation.

Another important regulating device is the "Sarco" mixing valve. This is an apparatus which enables a continuous discharge of water at a constant temperature, while obviating the generating of steam in the water system with the consequent disagreeable sputtering and blowing off when the faucet is open, as well as eliminating the danger of scalding or other accidents.

This mixing valve is constructed so that hot water or steam is supplied at one side and cold water on the other side. In the interior of the valve there is a mixing chamber containing an expanding cartridge which controls the size of the hot water or steam inlet. The discharge water is maintained at a temperature which it is claimed will not vary within one degree under ordinary conditions. It is made in various styles.

The style shown in the cut is a double seated valve for either high or low pressure steam. It has a safety tube and can be arranged for discharging water with a temperature of 80 degrees to 212 degrees F. All inner parts are made of copper and all visible parts are nickle plated. These valves can also be furnished with thermometer and hand regulation for valve seat. Such a mixing valve is invaluable wherever a supply of water at constant temperature is required in manufacturing operations or for other purposes.

These appliances are manufactured by the Sarco Engineering Co., 116 Broad Street, New York, who will be glad to furnish additional information and suggestions for installation.

The necessity for larger space and better facilities to handle their increased business compelled the Indianapolis, Ind., and Louisville, Ky., branches of the H. W. Johns-Manville Company to seek larger quarters. The new address of the Indianapolis branch is 408-410 North Capitol avenue; that of the Louisville branch, 659-661 South Fourth avenue. Both of these branches will include ample warehouse accommodations in addition to show rooms for the display and sale of this firm's varied line of asbestos roofing, pipe coverings, insulating materials, lighting fixtures, automobile accessories, etc. In connection with the last named line, unusual pains have been taken in the equipment of service departments for the benefit of the customers who desire speedy adjustments, repairs or replacements.

Scott & Williams, Inc., of Boston, Mass., announce the opening of offices at 366 Broadway, New York, where there will be an operative showroom with a full line of knitting machines and a complete assortment of hosiery and underwear samples. Any officer or representative of the company may at any time be met there by appointment.

GLENLYON DYE WORKS

(Yarn Dept.)

CENTRAL FALLS, R. I.

FRANK A. SAYLES, Lessee

Bleachers and Dyers

OF

Cotton Yarns in Bal-warps and Skeins, Silk and Viscose Silk

SPECIALTIES: COLORS FAST TO BLEACHING, Mercerizing, Laundering, Cross Dyeing and Light. Dyed Novelty Effects in Fast Colors. High Grade Bleaching of Cotton Warps and Skeins. Silk Dyed Fast to Boiling Off and Bleaching.

Insist on Having

"GLENLYON DYED YARNS"

Safest and Most Reliable in the Market.

Write for Shade Card, Information and Guarantee.

Cortright Metal Shingles Are Fireproof

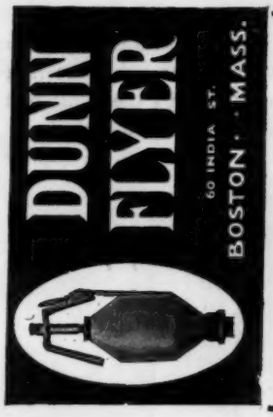
Every three minutes an American house catches fire—a large proportion from sparks falling on the roof. After the great fire in Chelsea, Mass., its fire chief recommended that wood shingles be barred from Chelsea **as unsafe roofing.** This is now a law in many communities.

Cortright Metal Shingles are the logical solution of the fire problem, for they can't catch fire, or crack, rot, curl-up or blow away. They meet every building and insurance requirement.

Cortright Metal Shingles are adaptable to any kind of structure. They cost but little, or no more than wood, much less than slate; they last indefinitely and never need repairs.

Our 1914 catalog gives full information regarding safety and economy in roofing material. Write for it today.

CORTRIGHT METAL ROOFING CO.
Philadelphia and Chicago



PERFECT BALANCE.
NO CHANGING SLOT.
TWIST RETAINED.
A " DOG DAY" FLYER

MORE AND BETTER ROVING

LESS DOFFING, HANDLING, SETTING IN, PIECINGS AND WASTE.

Costs No More
Makes and Saves You Money.

DUNN FLYER CO.
60 India St., Boston, Mass.

The "1912" Cloth Cutting, Folding and Winding Machine

This machine will cut down operating expenses. It does in one operation the work which is now being done in two. It cuts the cloth, folds the edges and rolls them up in one operation, and at all times gets one more strip out of a bolt of cloth than is possible with the old method of cutting. At the same time it measures the bolt of cloth to show the manufacturer whether or not he is getting the number of yards he is paying for. With the high price of cotton to-day every knit goods manufacturer ought to look into this to see if he is getting the maximum efficiency at the least expense. You will find when you come to figure it up in the course of a year that the labor it saves is a big item.

Also have other labor-saving devices, and upon application you can get prices and full information on same.

J. A. FIRSCHING, 50 John St., Utica, N.Y., U.S.A.

Clinton H. Scovell & Company

Certified Public Accountants
Industrial Engineers

40 Central Street, - - Boston, Mass.

Specialists in Textile Cost Accounting

PUX

A SOFTENER OF MERIT

Tested, used and pronounced perfect by some of the largest manufacturers in the world. It has no equal, for laces, hosiery, and all cotton and woolen goods.

Try It—You'll Like It

STANDARD SOAP CO., Camden, N. J.

FOR

SCOURING—WASHING

There is nothing which gives you the soft, harmless, thorough and low-priced results of

Alumina Soapalite

THE MINERAL SOAP

The Electric Smelting & Aluminum Co.
LOCKPORT, N. Y. Sole Manufacturers

A COMPLETE CATALOG

TEXTILE BOOKS

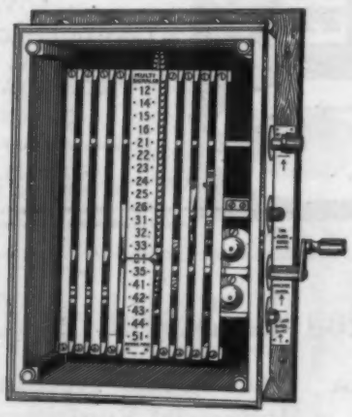
will be mailed on request.

Cotton Publishing Co., Atlanta, Ga.

AN EFFICIENT FACTORY CALLING SYSTEM.

In every textile mill the necessity for calling the superintendent, the department heads, the master mechanic, etc., is one which has to be met and one which usually causes much trouble and vexation. If a boy is sent for the person wanted it is a ten to one shot some one will have to go and look for the boy. What is desired is a system that will signal a call for the man desired in every department simultaneously. Such a system should not be confused with the interior telephone, but mills equipped with the latter will find an efficient signaling system of exceptional value. How frequently it is necessary for the operator to call up nearly every department on the interior telephone before locating the party desired, whereas with a signaling system that rings his number simultaneously in every room he is called to the phone or office immediately.

Some signaling systems are so complicated and expensive as to render them unavailable except for the largest plants, but a system recently introduced by the Multi Signal Co., of Boston, Mass., is so simple, effective and cheap as to be available for the smallest textile mill. It operates



The Signal Box.

simultaneously any number of electric bells, horns, buzzers or flashing lights, as the case may be, and will not only ring the number of the party desired but will also follow this with a signal showing him in what department of the mill he is wanted. A special bell is used for this purpose that can be rung as ordinarily or with an intermittent signal: this was developed for fire alarm purposes and can be used for such wherever desired.

The Multi Call is an automatic electric signalling device that is independent of any intercommunicating telephone system, although most commonly installed as an auxiliary to this. It can control any number of electric bells, buzzers, whistles, flashing lamps, etc., and provide a simple code signal for each official whose attention is desired. A special fire-alarm attachment is also provided by which instant alarm is given to all departments of the establishment. This is also used for calling fire drills that are now legally required in many parts of the country. The wiring is of the simplest character and can be done by anyone having ordinary knowledge of electric wiring; in fact, the system can be installed by the mill's regular force.

The call box is operated by a powerful spring motor and has but one sparking point, the contacts being made of hard carbon and copper that will last for years without renewal. In calling up a person the indicating pointer is moved to his number, then the spring motor is started by a twist of the operating key and this sounds the signal in all departments connected by the system, and as many times as desired. To signal the number of department called, or to operate the fire alarm, an extra switch is turned after the indicating pointer has been moved to the desired department number.

For operating the fire alarm, the special fire-alarm switch is first pushed; this brings a special set of loud-

Showing the Multi Call Attached to a Telephone Switchboard.

ringing gongs into action that are not used except for fire alarm. The indicating pointer is moved to the number of the department where the chief danger exists and the operating key is turned; this notifies the fire department just where the fire is located. Pilot lamps are provided to show whether the circuits are working properly.

This equipment has been developed and placed on the market by the Multi Signal Company, 14 Harrison Ave., Boston, Mass., who will furnish further information on request.

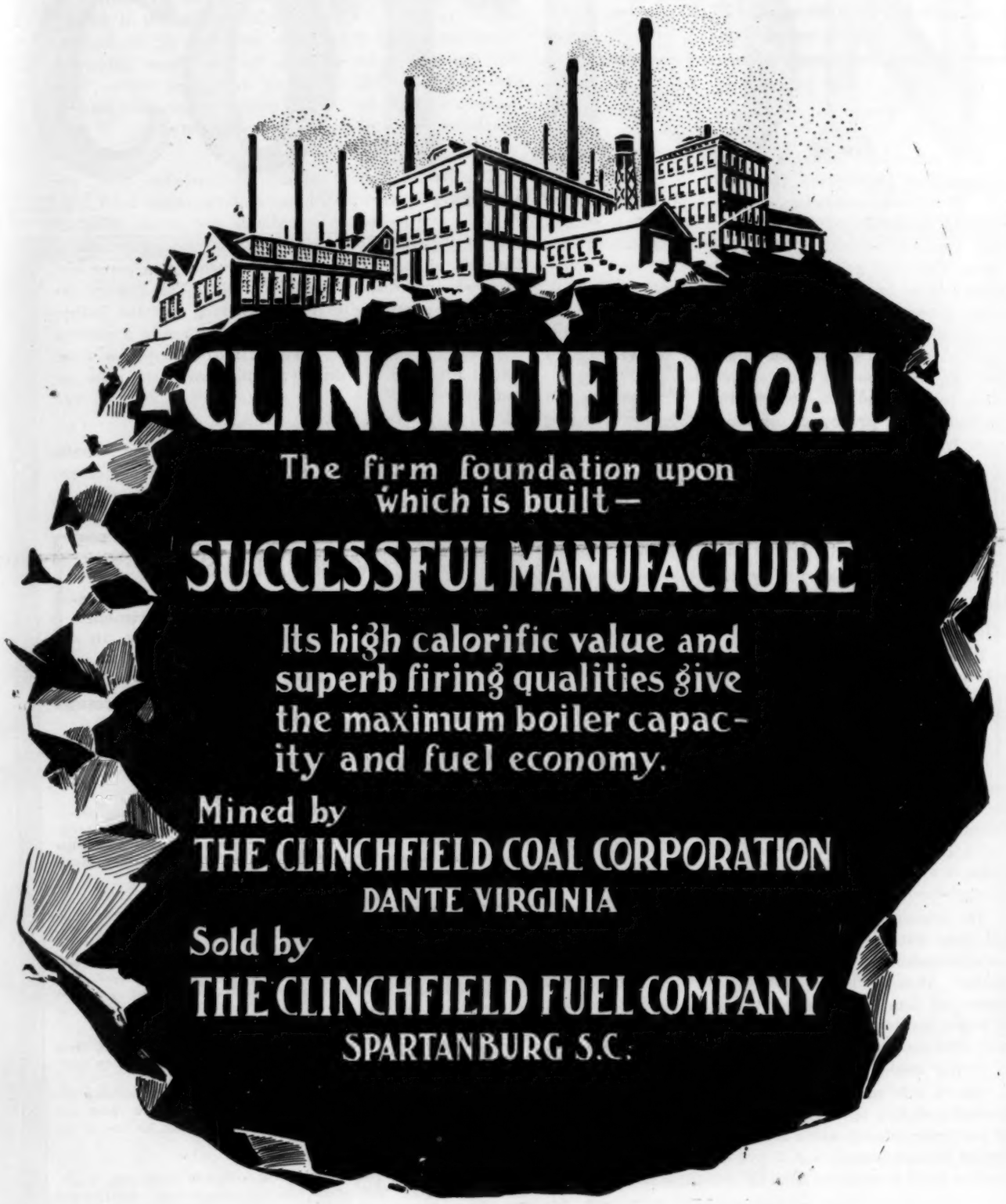
AMERICAN EXPORTER IN NEW QUARTERS.

The *American Exporter* has moved to 17 Battery Place, New York. The demand for office space to meet the requirements of the rapid growth of this publication's several editions and of its foreign trade service has entirely outgrown the accommodations available at the old offices, which were located at 135 William street.

Eight years ago, when this paper moved into 135 William street, its offices occupied 2,600 square feet. At the new address 5,400 square feet are available.

The new location is decidedly more convenient for the friends of the paper than the old one. Ever since the custom house was moved to its present location, the tendency of the export and shipping trade to center around Bowling Green and Battery Park has been marked. Hence the new location is the most easily accessible that could be found, both for foreign merchants and exporting manufacturers visiting the export district. No one can visit New York on export business without visiting the immediate neighborhood of the Whitehall building. All friends, old and new, are invited to call and inspect the new quarters.

An interesting installation of conveyor belting was recently made by the Charles Bond Company, 520 Arch street, Philadelphia, Pa. This belt was a "Veelos" Balata Belt, 30 inches wide, 6 ply, and 1,045 feet long.


CLINCHFIELD COAL
The firm foundation upon which is built—
SUCCESSFUL MANUFACTURE
Its high calorific value and superb firing qualities give the maximum boiler capacity and fuel economy.
Mined by
THE CLINCHFIELD COAL CORPORATION
DANTE VIRGINIA
Sold by
THE CLINCHFIELD FUEL COMPANY
SPARTANBURG S.C.

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

LEA'S COTTON BOOK. 1914 Edition. Compiled by James J. Lea, New Orleans, La. 124 pages. Price, cloth, $2.00; leather, $2.50.

This cotton book contains a brief statistical history of the American cotton crop from 1875 to 1913, inclusive, with an addenda embracing mill statistics and rules for weighing, measuring and numbering cotton yarns, an officially approved summary of the rules of the New Orleans Cotton Exchange governing the delivery of spot cotton, cotton sold on future contracts, and cotton sold on F. O. B. terms; a record of climatological conditions affecting the growth and out-turn of the American cotton crop, cotton ginning statistics; weights and values for lint cotton, seed cotton and cottonseed; a table of weights and earnings for cotton pickers, and other information of value to all branches of the producing, marketing and manufacturing cotton trade.

SOME NEW DYESTUFFS.

Diamine Fast Scarlet L 4 G and L 3 B and Diamine Aldehyde Scarlet G G are new dyestuffs that are thoroughly described in Supplements Nos. 5 and 6 to the well-known cotton book of the Cassella Color Company.

Diamine Aldehyde Scarlet G G appears to be particularly advantageous in the dyeing of union goods on account of the cotton taking up the color deeper than the wool and which enables the dyer to cross-dye with acid dyeing colors to give brilliancy to the wool.

This new dyestuff possesses very good fastness to washing and boiling in weak acids and is consequently a valuable addition to the well-known series of Diamine Aldehyde Colors of the Cassella Color Company. Owing to the level dyeing properties of this dyestuff it possesses distinct advantages when applied to the dyeing of cotton in mechanical appliances.

The Diamine Fast Scarlet L 4 G and L 3 B produce full, deep scarlet shades upon cotton and union goods and are distinguished by their excellent fastness to light and ironing. These dyestuffs are particularly interesting on account of their brilliancy and which will enable designers of cotton textiles to make use of the shades in combination with other contrasting effects in the production of wide lines of novelty goods.

The "L 3 B" mark is much bluer than the "L 4 G" mark bordering slightly upon the cardinal tone, and should prove of particular interest where heavy, full shades are required. Copies of supplements Nos. 5 and 6, describing these dyes may no doubt be obtained from the Cassella Color Company.

The railroads of the South give it splendid transportation facilities locally and to all parts of the country. Its steamer lines go to all Atlantic coast ports and to nearly all the seaboard nations of Europe and South America.

THE BAYER COMPANY, INC., 117 Hudson street, New York City, are sending to the trade the following color cards, which not only contain samples of the dyed material, but also directions for dyeing and further information of interest to dyers: Katigen Brilliant Black B R Extra; Benzoform Blue 2 B L; Benzo New Blue G; Diazo Brilliant Orange 5 G Extra; Diazo Brilliant Green 3 G; Acid Chrone Red B; Milling Yellow R G; and Chrone Fast Scarlet 2 G D Paste. Copies of these color cards may be secured by interested parties upon application.

THE BAILEY-LEBBY COMPANY, of Charleston, S. C., are announcing the fact that, because of the recent tariff revision, the rate on certain ingredients used in the manufacture of the Rex Flintkote roofing has enabled the manufacturers to turn out the finished product at a lower cost of production than formerly possible. The factory has given this advantage to its distributors, and the Bailey-Lebby Company therefore announce they are in a position to offer this well-known brand of roofing at prices which should command attention. Samples, etc., sent upon request.

The South is the front yard of the nation when it comes to our relations with Latin America and the use of the Panama Canal.

MILL NEWS

Notices of mill projects, additions or improvements are solicited for this department. Other notices pertaining particularly to the Southeastern section will be found in the Southern Mill Situation review.

ILLINOIS.

ROCKFORD. The Forest City Knitting Company have increased their capital stock to $210,000. They manufacture knitted goods.

MINNESOTA.

MINNEAPOLIS. The Northwestern Knitting Company is reported to have secured a 100-year lease on a 115 by 42 foot property, and expect to erect a four-story concrete store and office building on the site. This company manufactures men's, women's and children's union suits.

NEW JERSEY.

NEW BRUNSWICK. The Interwoven Stocking Company is to build a plant at Carlyle, Pa., where it has maintained a temporary knitting room for some time past for the instruction of operatives. The plant is to be of slow-burning mill construction, with brick walls, steel windows, wire glass and metal roof, with skylights covering practically the entire roof area, and is to cost approximately $40,000.

NEW YORK.

BROOKLYN. The Wyckoff Knitting Mills have moved from 381 Palmetto street to 1842 Summerfield street. This concern manufactures sweater coats, novelties and bathing suits.

UTICA. The Utica Willowvale Bleachery Co. is making arrangements to increase the output of sheets and pillow cases, and have rented several floors in the Munson building for use in the manufacture of these products.

OHIO.

CLEVELAND. The Friedman-Blau-Farber Company, manufacturers of fancy knit goods, are to increase their capital stock $200,000, making the capital stock of the company $500,000. It is understood that a part of the increased capital will be devoted to adding to the facilities of the three Eastern plants of the company at New York City, Brooklyn and Newark, N. J.

CLEVELAND. The Wovenright Knitting Company, manufacturers of men's seamless hosiery, have increased their capital stock to $50,000.